

ASSESSMENT OF POTENTIAL
COAL-LIQUID MIXTURE FUEL
UTILIZATION IN CANADA - PHASE III

FINAL REPORT
BY
MONTREAL ENGINEERING COMPANY, LIMITED

MICROMEDIA

Work on this project was conducted under the auspices of the Canada Centre for
Mineral and Energy Technology, Energy, Mines and Resources, Canada.

155 pp

DSS FILE NUMBER	: 14SQ.23440-1-9080-1
DSS CONTRACT SERIAL NUMBER	: OSQ81-00227
CANMET PROJECT NUMBER	: 430701
CANMET SCIENTIFIC AUTHORITY	: DR. H. WHALEY



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Attention: Dr. H. Whaley

Gentlemen:

Assessment of Potential Coal-Liquid Mixture Fuel
Utilization in Canada - Phase III
DSS File: 14SQ.234401-9080-1

Please find enclosed our final report on Phase III, covering the Provinces of Quebec, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia. Since the required coal for CLM applications in these provinces was to be supplied from Nova Scotia and Alberta, with coals of different qualities, the analyses were carried out in two parts: one covering Quebec and Ontario, and the other, the remaining provinces. The final results, however, are presented in total sums for all of Canada (excluding the Atlantic provinces).

With a copy of this letter, we forward one copy each of the report to Dr. R. Thomson, CANMET and Dr. Maureen Brock, Science Procurement Centre.

We would like to take this opportunity to thank you and Dr. R. Thomson for the attention and support received throughout this study and to express our appreciation to Dr. M. Brock for her kind co-operation.

Yours very truly,

S. Detre
Manager, Thermal Study Group

SD/cr
Encl.

cc: Dr. M. Brock, DSS (Encl)
Dr. R. Thomson, CANMET (Encl)

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PART 1
GENERAL

PART 1 - GENERAL

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1.1 INTRODUCTION

This report constitutes the third phase of Canada's contribution to a study by the International Energy Agency to assess the potential markets for coal-liquid mixtures (CLM) as a viable substitute for the ever dwindling supply of fuel oil.

Contracted by the Canada Centre for Mineral and Energy Technology (CANMET), Montreal Engineering Company, Limited (Monenco) has assessed Canada's potential market for CLM in three consecutive phases, covering industrial, commercial and utility sectors.

While the Province of Nova Scotia was examined in Phase I, the other Atlantic Provinces (New Brunswick, Prince Edward Island, and Newfoundland) were covered in Phase II. The summary findings of these investigations were presented under separate covers. This report presents the assessment results of the remaining Canadian provinces: Quebec, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia.

1.2 SCOPE

This study, based on the objectives described in the "Guidelines for Subtask A: Assessment of Potential CLM Utilization" provided by CANMET, covers the following areas:

- Subtask A1: Fuel Resources
- Subtask A2: Boiler and Combustor Data: A survey of utility boilers, industrial boilers and industrial process heaters/combustors, rated at 20 million Btu/hr or greater in the Atlantic Provinces (New Brunswick, Prince Edward Island, Newfoundland and Nova Scotia) and 50 million Btu/hr or greater in the remaining provinces (Quebec, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia).
- Subtask A3: Environmental Data: provincial emission standards for fuel combustion.

Note: A later revision of the contract added the following areas to the scope of this study.

- Subtask A1, Item 3.0: CLM Preparation Plants
Item 4.0: CLM Transportation
- Subtask A4: Institutional Factors
- Subtask A5: Financial Data and Cost Data for Financial Analysis
- Task B: Development of an IEA CLM Co-operative Plan.

These areas have been covered in a separate report to CANMET. However, the Final Report on Phases II and III will include the new additions and will cover the entire scope of Tasks A and B, as defined in the Guidelines.

1.3 METHODOLOGY

The methodology adopted to fulfill the objectives of the study is summarized below.

131 Resources

As instructed by the Scientific Authority, this report assumes that all coal required for CLM conversions in all provinces east of Manitoba will be supplied from the Prince Mine and the Donkin Mine located at the Cape Breton Island, in Nova Scotia; the remaining provinces (Manitoba, Saskatchewan, Alberta and British Columbia) will receive coal from the Coal Valley Mine, developed by Luscar Sterco Ltd. in the Foothills region of Alberta.

132 Oil-Fired Boiler Survey

Three slightly different questionnaire formats were prepared to accumulate the requested statistical data on:

- Utility boilers
- Industrial boilers
- Industrial process heaters/combustors

Provincial Boiler Inspector offices were contacted in each of the provinces to obtain a list of oil-burning equipment rated at 50 million Btu/hr or greater. This approach, however, did not prove successful in the provinces of Quebec and Saskatchewan, where no such comprehensive lists exist. Also in Ontario, the list obtained from the Pressure Vessels Branch of the Ministry of Consumer and Commercial Relations did not include oil-fired heaters/combustors.

In the cases of Ontario and Quebec, the major manufacturers of boilers and heaters had to be contacted in order to obtain lists of oil-burning equipment, rated at or above 50 million Btu/hr, sold since 1940. This proved to be the only feasible approach under the circumstances. In the case of Saskatchewan, contacts were made with nine out of the twelve regional boiler inspectors and inquiries were made of their knowledge of the oil-fired installations in the Province.

Furthermore, various other governmental and private agencies in each province were contacted for additional information and input.

The following statistics provide a perspective of the extent and success of the survey in each province.

a) Quebec

Replies from the manufacturers contacted lead to the initial recognition of ninety companies as potential prospects. However, the final account of the companies qualifying for the survey were as follows:

Utility Boilers	- None
Industrial Boilers	- Seventy-eight units owned by thirty companies
Industrial Heaters and Combustors	- Four units owned by two companies

b) Ontario

More than three hundred and fifty companies were approached on the basis of the list obtained from the Ministry of Consumer and Commercial Relations and other lists supplied by several heater manufacturers. The final tally of the companies qualifying are as follows:

Utility Boilers	- None
Industrial Boilers	- Forty-seven units owned by twenty companies
Industrial Heaters and Combustors	- None

c) Manitoba

Contact with the Provincial Boiler Inspector determined that only one industrial company qualified in Manitoba. However, in spite of numerous contacts, no responses were received to the questionnaire.

d) Saskatchewan

No list of oil-fired boilers exists within the Department of Labour. Individual contacts with nine out of the twelve Regional Boiler Inspectors determined that no units exist in this Province that would qualify for the survey.

e) Alberta

A list of registered boilers was obtained from the Boiler Branch, Alberta Department of Labour, and more than eighty companies were contacted. The results of the telephone survey indicated that all boilers having capacities greater than 35,000 lb/hr steam flow in the Province were either firing coal or gas as their primary fuel.

f) British Columbia

A list was obtained from the Boiler Inspector's office and fifty-nine companies were recognized as potential prospects. However, after the initial contact, the list of prospects was reduced to the following:

Utility Boilers	- None
Industrial Boilers	- Twenty units owned by nine companies
Industrial Heaters and Combustors	- One unit

g) Northwest Territories

Although not considered in the contract, Northwest Territories were also included in an attempt to make the survey as comprehensive as possible. One qualifying boiler in the Inuvik Utility Station was identified and included in the Study.

133 Environmental Regulations

In-house data and information obtained from appropriate sources in provincial Ministries of Environment were collected to summarize the provincial and local regulation on emission standards, water usage and waste disposal.

1.4 REPORT ORGANIZATION

141 Sequence

The sequence in this report complies with that of the "Guidelines", mentioned in Section 1.2 above, and is as follows:

- Subtask A1: Fuel Resources
- Subtask A2: Boiler and Combustor Data
- Subtask A3: Environmental Data

The calculation of the required coal quantities is included in Appendices B and C of this Report. Due to less than 100% response to our questionnaires, and in order to account for the possibility of some installations having been missed (because they have not been shown on any of the lists perused) the total demand of coal required for COM and CWM conversion was increased by 5% in excess of the value calculated from the data collected or estimated by MECo.

For easier identification of the information by the IEA, we have also adopted the numbering system of the Guidelines.

PART 2

SUBTASK A1: FUEL RESOURCES

PART 2 - SUBTASK A1: FUEL RESOURCES

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1.0

COAL FOR CLM APPLICATIONS

1.1

COAL SUPPLIES (Current Situation)

C. Domestic and Imported.

Comments:

- Ontario Some 218 megatons of high moisture lignitic coal resources have been found over an area of about 39 km², known as the Onakawana Coalfield.

However, the quality of this lignite makes its transportation uneconomical, and Ontario Hydro's utility plants operate on coal imported to a large part from the USA, and to a smaller part from Alberta and British Columbia.

- Saskatchewan This province has about 7.6 billion tons of measured, indicated and inferred lignite resources, located in the southern part of the province. The Saskatchewan Power Corporation (SPC) uses about 90 percent of lignite production for power generation.
- Alberta Alberta has the largest Canadian coal resources with some 165 billion tons of measured, indicated and inferred resources of bituminous and sub-bituminous coals. While the principal market for bituminous metallurgical coal continues to be Japan, a small portion of it is also purchased by Ontario Hydro. The bulk of bituminous thermal coal in Alberta is produced by Luscar Sterco (1977) Ltd. at the new Coal Valley Mine in Foothills region.

Sub-bituminous coal in Alberta occurs exclusively in the Plains region and is used principally for electric power generation. Calgary Power Ltd. is the largest operator and producer of sub-bituminous coal in Alberta.

- British Columbia British Columbia has substantial coal resources and produces about 60% of Canada's metallurgical coal and about 10% of its thermal coal. According to EM&R about 70 billion tons of bituminous coal is in place (measured, indicated and inferred) in the Cordilleran region. This coal is mostly of the low and medium volatile bituminous variety, although some high volatile is also present. The coal is generally low in sulphur and friable. Some of the thermal coal produced in this province is sold to Ontario Hydro.

1.2 ESTIMATED ADDITIONAL COAL REQUIREMENTS FOR CLM APPLICATIONS

Due to the prevailing economic uncertainties, some respondents to our questionnaires declined to make any projections for their fuel consumption beyond 1982; others stated that the requirements will remain substantially unchanged from those in 1982; most others predicted cutbacks in production and therefore in fuel requirements due to decreasing market demands for their products or services. In many cases, no records were kept of the individual boilers' oil consumption rates. In these cases, estimates had to be made by Monenco on the basis of other information supplied by the Owner, (e.g. the actual pounds of steam generated in one year; the percentage of each unit's contribution to the plant's overall operation; etc.).

Accordingly, the 1985 coal demand rates were estimated on the basis of either the Owner's or Monenco's predictions of the Company's oil consumption rate beyond 1982.

The quantities were estimated for the following two cases:

- .1 Every candidate boiler and heater converted to coal-oil mixture (COM).
- .2 Every candidate boiler and heater converted to coal-water mixture (CWM).

With these assumptions, the following CLM coal consumption can be forecast for Canada (excluding Maritime Provinces) in the year 1985:

- | | | |
|----|---------|-------------------|
| a. | All COM | 2.33 megatons/yr. |
| b. | All CWM | 4.88 megatons/yr. |

1.3 THIS INCREASED TONNAGE CAN BE MET BY:

- C. Increased Coal Imports

Comments:

According to the Scientific Authority, any increase in the coal requirements of a province due to conversion to CLM will be met by an increase in imported coal tonnage from Nova Scotia or Alberta. Coal from the Sydney area in Nova Scotia will be supplied to provinces east of Manitoba, while the coal from Alberta's Foothills region will be supplied to the remaining provinces.

1.4 COAL CHARACTERISTICS (As Received)

141 From the Donkin Mine, developed by the Cape Breton
Development Corporation (DEVCO):

Donkin Mine, Sydney Area*

HHV, Btu/lb 12,000

Proximate Analysis (in % weight)

Volatiles	30-32
Fixed Carbon	48-50
Ash	14-18**
Moisture	6

Ultimate Analysis (in % weight)

Carbon	64-85
Moisture	6
Hydrogen	5.5
Sulphur	2.6-4.5
Nitrogen	1.5
Oxygen	4.5-5.0
Ash	14

Grindability (Hardgrove) 65-70

Ash Fusion temperatures (°F)

Initial	2444
Softening	2532
Fluid	2588

Inorganic/organic sulphur ratio

Not advisable to be
presented as a fixed ratio
since the inorganic
sulphur content of the
coal may vary considerably
from time to time (i.e. it
may range from 87/30 to
136/30).

Susceptibility to physical beneficiation Yes, to some extent

* Reference 1 (Page 2-6).

** Higher ash contents are expected prior to 1988.

Coal Valley, Foothills Region*

HHV, Btu/lb	10,900
-------------	--------

Proximate Analysis (in % weight)

Volatiles	34
Fixed Carbon	48
Ash	9
Moisture	9
Sulphur	0.2-0.3

Ultimate Analysis (in % weight)

Carbon	62
Moisture	9
Hydrogen	4.5
Sulphur	0.2-0.3
Nitrogen	0.8-1.0
Oxygen	14.5
Ash	9

Grindability (Hardgrove)	44-55
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Ash Fusion temperatures (°F)	
Initial	2070-2250
Softening	2196-2322
Fluid	2430-2547

Inorganic/organic sulphur ratio	approx. 50/50
---------------------------------	---------------

Suseptibility to physical beneficiation	Yes, to some extent
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* Reference 2 (Page 2-6).

1.5 COAL TYPE/MINE

Donkin Mine	High-volatile A-Bituminous
Coal Valley	High-volatile Bituminous

1.6 MINING SITES

See attached map (Figure 1, Page 2-7).

2.0 OIL FOR CLM APPLICATION

2.1 GRADE OF OIL USED

A. No. 6, Bunker C (for COM only)

Comments:

No. 2 oil would be used in small quantities if spherical coal agglomeration were introduced as a pretreatment for COM preparation.

2.2 OIL SUPPLIES

B. Domestic: Refined from Alberta Crude

2.3 OIL CHARACTERISTICS

The following is a sample analysis of a No. 6, Bunker C oil, produced in Alberta.

Alberta Bunker C Oil*

HHV, Btu/lb	18,500
Sulphur Content, %	3.0 (max)
Vanadium Content, ppm	0
Asphaltine	Data not available
Pour Point, °F	37.8
Flash Point, °F	119 (min)
Viscosity SFS @ 90°F	51.3

* Reference 3 (Page 2-6).

2.4

REFERENCES

1. Private communications with Cape Breton Development Corp., Nova Scotia.
2. Private communications with Luscar Sterco, Alberta.
3. Private communications with an Edmonton, Alberta refinery.





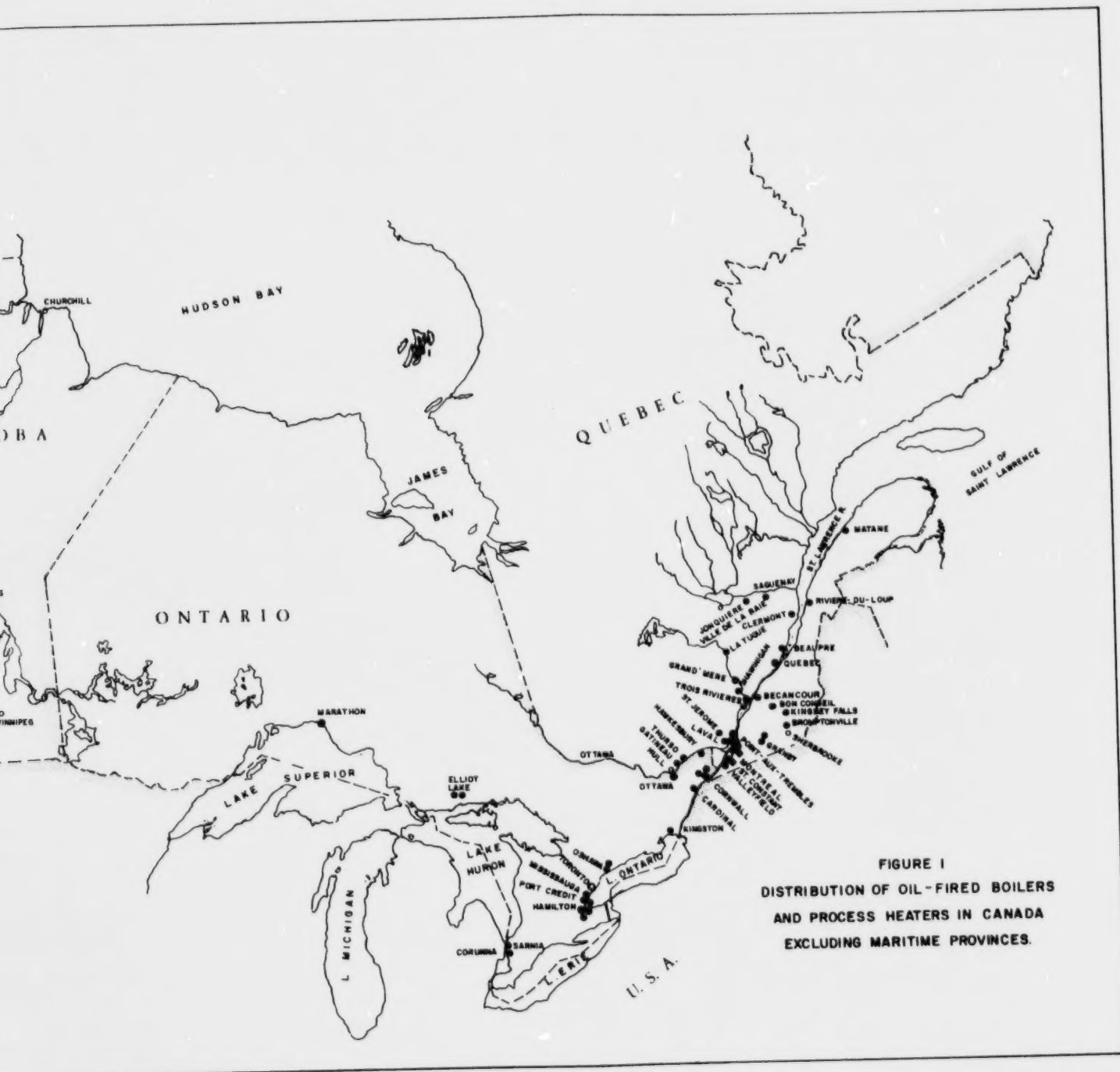


FIGURE 1
DISTRIBUTION OF OIL-FIRED BOILERS
AND PROCESS HEATERS IN CANADA
EXCLUDING MARITIME PROVINCES.

PART 3

SUBTASK A2: BOILER AND COMBUSTOR DATA

PART 3 - SUBTASK A2: BOILER AND COMBUSTOR DATA

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1.1 UTILITY OIL-FIRED BOILER CATEGORIES

Two oil-fired utility stations, Tracy in Quebec and Lennox in Ontario were identified. Both these stations were excluded from the study due to insignificant oil consumption rate of the Tracy Station, which is on standby, and plans for "mothballing" of the Lennox Station this year.

One other qualifying unit, owned and operated by the Northern Canada Power Commission, was located in the Inuvik Station in the Northwest Territories. However, since this unit provides only hot water for the town and produces no electricity, it was included in the industrial boilers category.

2.1 INDUSTRIAL OIL-FIRED BOILER CATEGORIES

210 General

The Guidelines established the following subdivisions for industrial boilers:

- .1 Originally Designed for Coal-Firing
- .2 Originally Designed for Oil-Firing
 - . Packaged Firetube Boilers
 - . Packaged Watertube Boilers
 - . Modular and Field-Erected Boilers

The first category of industrial boilers includes both stoker and pulverized coal-fired boilers which were converted to oil-firing when oil was economical and its supply guaranteed.

The second category is divided into three distinctive sub-categories. The firetube boilers are generally small. The package watertube boilers have been developed around the use of petroleum fuels. For these premium fuels, the furnace volumetric heat release rate is higher than for field-erected boilers. The compact design of a package watertube boiler results in closer tube spacings which consequently lead to higher gas velocities.

Detailed characteristics and type of industrial boilers covered in this survey and as collected from the owners are included in Appendix A.

As indicated in our report on Phase I (covering Nova Scotia) one other category, boilers originally designed for dual fuel combustion, was identified in addition to the above listed major design categories specified in the Guidelines. While only few boilers of this type were found in Phase I, our market survey, covering the other Maritime Provinces and also the rest of Canada, indicates that

many boilers of the major pulp and paper industries and refineries would fall into this category. In order to comply with the categories specified in the Guidelines, those units originally designed for dual fuel combustion which generated more than 30 percent of their annual production by fuel oil, were categorized as units originally designed for oil. However, their alternative fuels have also been indicated in each case in the data sheets displayed in Appendix A.

Four major steel Companies, the Algoma Steel Corporation, Stelco Inc., Sidbec-Dosco, and Dofasco were contacted in this survey. The result of these contacts indicate that although some of steel plants still operate partially on oil, most of them have significantly cut back on their oil consumption and plan on phasing out its consumption within the next few years. Actual data and information were obtained only on twelve of Dofasco's boilers in Hamilton, out of which only three qualified for the survey.

211 Oil-Fired Industrial Boiler, Originally Designed for Coal

A. Total Capacity in input heat rate, MW_t 1,787.4

B. Number of Units (boilers) 39

C. Age distribution (Number and Capacity by Age)

<u>Years Old</u>	<u>No. of Units</u>	<u>Output Capacity (MWt)</u>
over 50	8	220.4
41-50	12	414.4
31-40	11	381.6
21-30	8	435.8
11-20	-	-
1-10	-	-
Less than 1	-	-

D. Size distribution (Number and Capacity by Size)

<u>Size (MWt)</u>	<u>No. of Units</u>	<u>Output Capacity (MWt)</u>
6 - 13.9	-	-
14 - 27.9	10	225.7
28 - 57.9	25	939.0
58 - 87.9	3	182.0
88 - 116.9	1	105.5

E. Capacity Factor

Range	0.05-0.79
Average (Weighted)	0.35

F.	Geographical distribution	See map (Figure 1)
G.	Major Manufacturers of boilers	Combustion Engineering Babcock & Wilcox Foster Wheeler
H.	Major industrial users	Sugar industry; Pulp & Paper industries; Auto industry; Chemical industry

212 Oil-Fired Industrial Boiler, Originally Designed for Oil, Package,
Firetube

A.	Total capacity in input heat rate, MW _t	157.0
B.	Number of units	3
C.	Age distribution (Number and Capacity by Age)	
	<u>Years Old</u>	<u>No. of Units</u> <u>Output Capacity (MWt)</u>
	over 50	- -
	41-50	- -
	31-40	- -
	21-30	- -
	11-20	3 134
	1-10	- -
	Less than one	- -
D.	Size distribution (Number and Capacity by Size)	
	<u>Size (MWt)</u>	<u>No. of Units</u> <u>Output Capacity (MWt)</u>
	6 - 13.9	- -
	14 - 27.9	1 26.4
	28 - 57.9	2 107.6
	58 - 87.9	- -
E.	Capacity Factor	
	Range	0.22-0.38
	Average (Weighted)	0.25
F.	Geographical distribution	See map (Fig. 1)
G.	Major manufacturers of boilers	Dominion Bridge Volcano

H. Major industrial users

Northern Canada Power
Commission;
CN Railways

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Oil-Fired Industrial Boiler, Originally Designed for Oil, Package,
Water-tube

A. Total capacity in input heat rate, MW_t 1,354.2

B. Number of units 42

C. Age distribution (Number and Capacity by Age)

<u>Years Old</u>	<u>No. of Units</u>	<u>Output Capacity (MWt)</u>
over 50	-	-
41-50	-	-
31-40	-	-
21-30	1	33.7
11-20	10	221.3
1-10	28	752.0
Less than one	3	58.6

D. Size distribution (Number and Capacity by Size)

<u>Size (MWt)</u>	<u>No. of Units</u>	<u>Output Capacity (MWt)</u>
6 - 13.9	-	-
14 - 27.9	27	491.6
28 - 57.9	15	573.8
58 - 87.9	-	-

E. Capacity Factor

Range 0.02-0.79
Average (Weighted) 0.26

F. Geographical distribution

See map (Figure 1)

G. Major manufacturers of boilers

Babcock & Wilcox
Combustion Engineering
Foster Wheeler
Volcano
Vickers Keeler

H. Major industrial users

Universities; Steel
industry; Pulp and paper
industry; Chemical
industry; Auto
industry;
Manufacturers; Sugar
industry

I. Type of boilers

D; A; O

214

Oil-Fired Boiler, Originally Designed for Oil, Modular and Field-Erected, Water-tubeA. Total capacity in input heat rate, MW_t 5,567

B. Number of units 62

C. Age distribution (Number and Capacity by Age)

<u>Years Old</u>	<u>No. of Units</u>	<u>Output Capacity (MWt)</u>
Over 50	3	60.1
41 - 50	-	-
31 - 40	1	36.6
21 - 30	20	772.5
11 - 20	25	2062.9
1 - 10	12	1116.6
Less than 1	1	56.3

D. Size distribution (Number and Capacity by Size)

<u>Size (MWt)</u>	<u>No. of Units</u>	<u>Output Capacity (MWt)</u>
6 - 13.9	-	-
14 - 27.9	12	234.7
28 - 57.9	18	756.7
58 - 87.9	11	730.6
88 - 116.9	13	1215.1
117 - 146.9	4	483.6
147 - 190.5	4	684.3

E. Capacity factor

Range	0.03-0.92
Average (Weighted)	0.35

F. Geographical distribution

See map (Fig. 1)

G. Major manufacturers of boilers

Babcock & Wilcox
 Foster Wheeler
 Combustion Engineering
 Dominion Bridge
 Zurn
 Vickers Keeler
 Kidwell

H. Major industrial users

Pulp & Paper; Sugar
industries; Industries;
Refineries;
Manufacturers;
Universities; Chemical
industry

3.1 OIL-FIRED PROCESS HEATERS AND COMBUSTORS

The Guidelines establish the following categories for the process heaters and combustors:

"The oil-fired industrial process heaters and combustors will be classified into the following categories according to the original design fuel, the industry and the application.

- .1 Originally designed for coal-firing
 - . Industry
 - . Application
- .2 Originally designed for oil-firing
 - . Industry
 - . Application"

311 Oil-Fired Industrial Process Heater, Originally Designed for Coal

- None -

312 Oil-Fired Industrial Process Heater, Originally Designed for Oil

A. Total capacity in input heat rate, MW_t 380.6

B. Number of units (heaters) 5

C. Age distribution (Number and Capacity by Age)

<u>Years Old</u>	<u>No. of Units</u>	<u>Output Capacity (MWt)</u>
21-30	1	70.9
11-20	3	132.8
1-10	1	58.6
Less than one	-	-

D. Size distribution (Number and Capacity by Size)

<u>Size (MWt)</u>	<u>No. of Units</u>	<u>Output Capacity (MWt)</u>
6 - 13.9	-	-
14 - 27.9	1	24.4
28 - 57.9	3	167.0
Larger than 60	1	70.9

E. Capacity factor

Range	0.41 - 0.77
Average (Weighted)	0.57

F. Geographical distribution

See map (Figure 1)

G. Major manufacturers of heaters

Taylor Coen; F.L. Smith
Canada; Allis Chalmers

H. Major industrial users

Pulp and Paper
industry; Cement
industry

I. Application processes

Lime kiln; Cement
drying

PART 4

SUBTASK A3: ENVIRONMENTAL DATA

PART 4

SUBTASK A3: ENVIRONMENTAL DATA

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4.E ALBERTA

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4.A QUEBEC

1.0 LOCAL REGULATIONS ON TRANSPORTATION, PREPARATION, STORAGE AND HANDLING

Refer to Section 1.4.

1.1 FUGITIVE DUST

Maximum permissible limit is 50 mg/m³ for any operation involving the handling or transfer of bulk materials.

1.2 LEACHING FROM COAL STORAGE PILES

Refer to Section 1.4.

1.3 HYDROCARBON EMISSIONS

Refer to Section 1.4.

1.4 COMMENTS

Quebec does not have regulations which apply specifically to the transportation, preparation, storage and handling of coal and coal liquid mixtures. Quebec operates on a permit system for new facilities and proposed modifications to existing facilities based on an environmental impact assessment, which is submitted to the Ministry of Environment for review and approval. This allows the Quebec Ministry of Environment to set limits on all relevant aspects of water usage, solid and liquid waste disposal and air emissions on a case-by-case basis.

2.0 LOCAL REGULATIONS ON EMISSION STANDARDS

The standards for atmospheric quality throughout Quebec are summarized in Table 1. Fossil fuel burning equipment cannot emit particulate matter into the atmosphere beyond the standards prescribed in Table 2.

3.0 LOCAL REGULATIONS ON WATER USAGE

Refer to Section 1.4.

4.0 LOCAL REGULATIONS ON WASTE DISPOSAL

Refer to Section 1.4.

TABLE 1
Atmospheric Quality Standards - Quebec

Type of Contaminants	Average Value	Duration
Suspended Particulates	0-150 mg/Nm ³ 0-70 mg/m ³	Average over 24 hours Annual geometric average
Dust Fall	0.75 tonnes/km ²	Average over 30 days
Sulphur Dioxide (SO ₂)	0-0.5 ppm (0-1310 mg/Nm ³)	Average over 1 hour
	0-0.11 ppm (0-228) mg/Nm ³)	Average over 24 hours
	0-0.2 ppm (0-52 mg/Nm ³)	Annual average
Carbon Monoxide (CO)	0-30 ppm (0-34 mg/Nm ³)	Average over 1 hour
	0-13 ppm (0-15 mg/Nm ³)	Average over 8 hours
Ozone (O ₃)	0-0.08 ppm (0-157 mg/Nm ³)	Average over 1 hour
Hydrogen Sulphide (H ₂ S)	0-10 ppb (0-14 mg/Nm ³)	Average over 1 hour
	0-8 ppb (0-11 mg/Nm ³)	Average over 2 hours
Nitrogen Dioxide (NO ₂)	0-0.22 ppm (0-414 mg/Nm ₃)	Average over 1 hour
	0-0.11 ppm (0-207 mg/Nm ₃)	Average over 24 hours
	0-0.055 ppm (0-103 mg/Nm ₃)	Annual average
Lead	0-2 mg/m ³	Annual geometric mean
Fluoride	40 ppm	Average over 12 months Monthly average not to be exceeded for more than 2 consecutive months/year.
	80 ppm	Monthly average which cannot be exceeded more than 1 month/year

ppm: parts per million in volume except for fluoride which is weight concentration on dry basis.

ppb: parts per billion in volume.

TABLE 2
Gaseous Emission Standards - Quebec

Heat Input Capacity in Fuel as Fired	Type of Fuel	Emission Standards Installation	
		New	Existing
<u>Particulates (mg/MJ)</u>			
3-15 MW	Gas or oil product	60	85
≥ 15 MW	Gas or oil product	45	60
3-70 MW	Coal	60	85
≥ 70 MW	Coal	45	60
>125 MW	Any Fuel	-	45
<u>Nitrogen Oxide (ppm dry basis @ 3% O₂)</u>			
≥ 70 MW	Coal	500	-
	Oil	250	-
	Gas	200	-
15-70 MW	Coal	450	-
	Oil	325	-
	Gas	150	-

4.B ONTARIO

5.0 LOCAL REGULATIONS ON TRANSPORTATION, PREPARATION, STORAGE AND HANDLING

Refer to Section 5.4.

5.1 FUGITIVE DUST

Refer to Section 5.4.

5.2 LEACHING FROM COAL STORAGE PILES

Refer to Section 5.4.

5.3 HYDROCARBON EMISSIONS

Refer to oil and grease concentrations in Table 3.

5.4 COMMENTS

The Ontario Ministry of the Environment does not have regulations as such which cover the environmental concerns related to the transportation, preparation, storage and handling of coal and coal liquid mixtures. Instead, Ontario has outlined goals and objectives to meet environmental requirements for the control of contaminants being discharged either in air or water, whether they be identified as leachates from coal storage piles, fugitive dust, hydrocarbon emissions, water usage and liquid waste disposal. These goals and objectives are outlined in Appendix D.

6.0 LOCAL REGULATIONS ON EMISSION STANDARDS

Ontario's Ministry of the Environment follows their own criteria with respect to air quality objectives. The ambient air emission levels used by Ontario are similar to the acceptable levels recommended by the Federal Government. Regulations for the future allowable emissions of SO₂ and NO_x have been adopted this year. It states that the total combined emissions of SO₂ and NO_x from 1986-1989 should not exceed 500 kilotons/year and after 1989 the amount is to

be less than 330 kilotons/year. The portion of SO₂ from 1986-1989 is to be less than 430 kilotons/year and after 1989 it is to be less than 400 kilotons/year.

In the Province of Ontario each stack has a limit on its SO₂ emission of 0.3 ppm.

In addition to ambient air quality objectives, the Department of the Environment has established impingement numbers for each and every stack in the Province. This number is based on a one-half hour interval from when the emissions are expelled from the stack and when they intersect a physical obstruction such as a hill, building, etc. Table 4 illustrates 1/2 hour impingement numbers for various air emissions.

7.0 LOCAL REGULATIONS ON WATER USAGE

The use of Ontario's water by industry is covered on a permit basis and is dependent on drainage areas involved and the types of contaminants to be discharged as well as on other criteria outlined in the Ministry's publication, "Water Management, Goals, Policies, Objectives and Implementation Procedures of the Ministry of the Environment".

8.0 LOCAL REGULATIONS ON WASTE DISPOSAL

Ontario does not have specific regulations covering the waste disposal from coal or CLM fired installations but does have a number of objectives to control the discharges or industrial wastes in the Province. These objectives are listed in Appendix D.

TABLE 3

Total Suspended Solids	15 ppm
Phenol	0.02
Ammonia	10
pH	5.5 - 9.5
Oil and Grease	10

TABLE 4

SO ₂	830 ug/m ³
Particulates	100 ug/m ³
CO	6000 ug/m ³
NO _x	500 ug/m ³
Hydrogen Sulphide	30 ug/m ³
Hydrogen Fluoride (gaseous state)	8.6 ug/m ³ (15 April-15 October) 17.2 ug/m ³ (16 October-14 April)
Lead	10 ug/m ³ (Free and Combined)

4.C MANITOBA

9.0 LOCAL REGULATIONS ON TRANSPORTATION, PREPARATION, STORAGE AND HANDLING

Refer to Section 9.4.

9.1 FUGITIVE DUST

Refer to Section 9.4.

9.2 LEACHING FROM COAL STORAGE PILES

Refer to Section 9.4.

9.3 HYDROCARBON EMISSIONS

Refer to Section 9.4.

9.4 COMMENTS

Manitoba Environmental Management does not have regulations as such which cover the environmental concerns related to the transportation, preparation, storage and handling of coal and coal liquid mixture. Manitoba has flexible regulations so that the environmental standards a company must meet can be established on a case-by-case basis. In the absence of regulations covering fugitive dusts, leaching from coal storage piles, controls of hydrocarbon emissions, water usage, solid and liquid waste disposal and air emissions, the Environmental Control Service would investigate the proposed project and recommend to the Clean Environment Commission on what regulations should be implemented. Site specific factors are important in what control is required and, when applicable, the Province utilizes the Federal Metal Mining Liquid Effluent regulations and guidelines.

10.0 LOCAL REGULATIONS ON EMISSION STANDARDS

Manitoba Environmental Management adopts the maximum desirable and maximum acceptable concentrations for air contaminants

as outlined in the Federal Ambient Air Quality Objectives (Table 7 of Phase I Report). However, the final decision on the maximum level of contamination is the responsibility of the Clean Environment Commission, an independent quasi-government body. Decisions are on a case-by-case basis in which a recommendation made by the Air Pollution Control Branch on maximum contamination levels may be ignored. Also, utilities or large companies can apply to the Clean Environment Commission for an exemption from regulations, provided they implement strict control on emission levels.

11.0 LOCAL REGULATIONS ON WATER USAGE

Refer to Section 9.4.

12.0 LOCAL REGULATIONS ON WASTE DISPOSAL

Manitoba Environmental Management has general objectives covering the concentration of contaminants in effluents in a provincial document titled, "The Surface Water Quality Objectives". The specific use of the water by a company dictates the allowable concentration levels of contaminants. Rivers and lakes are classified as to their use and the desired quality. Therefore, all regulations and objectives are met on a case-by-case basis.

4.D SASKATCHEWAN

13.0 LOCAL REGULATIONS ON TRANSPORTATION, PREPARATION, STORAGE AND HANDLING

Refer to Section 13.4.

13.1 FUGITIVE DUST

Refer to Section 13.4.

13.2 LEACHING FROM COAL STORAGE PILES

Refer to Section 13.4.

13.3 HYDROCARBON EMISSIONS

Refer to Section 13.4.

13.4 COMMENTS

Saskatchewan Environment does not have regulations as such which cover the environmental concerns related to the transportation, preparation, storage and handling of coal and coal liquid mixture. However, consideration is being directed towards the development of regulations for the transportation of coal. Presently the province acts on a case-by-case basis in the process of issuing a licence for a company to operate. The licence contains clauses controlling the concentration levels of contaminants, as well as general regulations covering environmental contamination by industry. The licence also covers the amounts of water that can be extracted from rivers and lakes.

14.0 LOCAL REGULATIONS ON EMISSION STANDARDS

Saskatchewan has air quality objectives that meet the acceptable range of the Federal Air Quality Objectives (Table 7, Phase I Report).

15.0 LOCAL REGULATIONS ON WATER USAGE

Refer to Section 13.4.

16.0 LOCAL REGULATIONS ON WASTE DISPOSAL

Refer to Section 13.4.

4.E ALBERTA

17.0 LOCAL REGULATIONS ON TRANSPORTATION, PREPARATION, STORAGE AND HANDLING

Refer to Section 17.4.

17.1 FUGITIVE DUST

Refer to Section 17.4.

17.2 LEACHING FROM COAL STORAGE PILES

Refer to Section 17.4.

17.3 HYDROCARBON EMISSIONS

Refer to Section 17.4.

17.4 COMMENTS

The Province of Alberta does not have regulations as such which cover the environmental concerns related to the transportation, preparation, storage and handling of coal and coal liquid mixture. However, the province does have guidelines for coal mining and preparation to control sedimentation and solids removal as well as reclamation through the use of tailings ponds. Specific requirements covering fugitive dusts, leaching from coal storage piles, control of hydrocarbon emissions, in fact all relevant aspects of water usage, solid and liquid waste disposal are considered when applicable on a case-by-case basis.

18.0 LOCAL REGULATIONS ON EMISSION STANDARDS

The Province of Alberta has followed the acceptable range of ambient air quality objectives outlined in the Federal Government's Air Quality Objectives, Criteria and Regulations in Canada.

19.0 LOCAL REGULATIONS ON WATER USAGE

Water usage is examined case-by-case and covered by guidelines and a licencing process. New plants or industries require recirculatory systems to minimize the amount of water used for make-up. Existing plants or industries that use water directly from a river or lake are thoroughly studied to limit the amount of water extracted for their operations.

20.0 LOCAL REGULATIONS ON WASTE DISPOSAL

Refer to Section 17.4.

4.F BRITISH COLUMBIA

21.0 LOCAL REGULATIONS ON TRANSPORTATION, PREPARATION, STORAGE AND HANDLING

Refer to Section 21.4.

21.1 FUGITIVE DUST

Refer to Section 21.4.

21.2 LEACHING FROM COAL STORAGE PILES

Refer to Section 21.4.

21.3 HYDROCARBON EMISSIONS

Refer to Section 21.4.

21.4 COMMENTS

British Columbia has regulations covering the transportation, preparation, storage and handling of coal. The applicable regulations refer specifically to fugitive dust control. The Ministry of the Environment approaches each project or industry on a case-by-case basis to satisfy its objectives and, once the standards set by the permit can be met, issues a permit to operate. The permit often covers the control of surface runoff from sources of contamination, hydrocarbon emissions, water usage and disposal of wastes, and air emission standards. Leachates are also covered under a permit, but in British Columbia leachates from coal are not a serious problem because of their low sulphur content and the natural buffer British Columbia's geology provides.

22.0 LOCAL REGULATIONS ON EMISSION STANDARDS

The Ministry of the Environment for British Columbia uses revised ambient air quality objectives to those shown in the Federal Air Quality Objectives. The revised values are shown in Table 6.

In addition to ambient air quality, the Province has objectives to cover point source pollution from all industries in the province. These values for point source pollution are shown in Table 7.

23.0 LOCAL REGULATIONS ON WATER USAGE

Water usage is covered by general regulations and permits on a case-by-case basis. The Province typically requires that large industry provide cooling towers or other water recycling facilities with very little make-up water needed, to ensure that there is no excessive demand on British Columbia waterways.

24.0 LOCAL REGULATIONS ON WASTE DISPOSAL

The Ministry of Environment has objectives covering acceptable limits on the concentration of effluents that industry may discharge into the environment. These objectives on concentration levels are shown in Table 5.

TABLE 5

Effluent and Receiving Water Control Objectives - British Columbia

Total Suspended Solids (mg/L)	25-75
Total Dissolved Solids (mg/L)	2500-5000
Toxicity (96 hrs)	100%-80%
pH (96 hrs)	6.5-8.5 (low)
	6.5-10 (high)
Radium 226 (pCi/L)	<10
Aluminum (mg/L)	0.5-1.0
Ammonia as Nitrogen	1.0-10.0
Antimony (mg/L)	0.25-1.0
Arsenic (trivalent) (mg/L)	0.05-0.25
Total Deposition	0.10-1.0
Cadmium (mg/L)	0.01-0.1
Chromium (mg/L)	0.5-0.3
Copper (mg/L)	0.5-1.0
Cobalt (mg/L)	0.05-0.3
Cyanide (mg/L)	0.1-0.5
Fluoride (mg/L)	2.5-10.0
Iron (mg/L)	0.3-1.0
Lead (mg/L)	0.05-0.2
Manganese (mg/L)	0.1-1.0
Total Mercury (mg/L)	0-0.005
Molybdenum (mg/L)	0.5-5.0
Nickel (mg/L)	0.2-1.0
Nitrite or Nitrate as N (mg/L)	10.2-25.0
Phosphate (mg/L)	2.0-10.0
Selenium (mg/L)	0.05-0.5
Silver (mg/L)	0.05-0.5
Urano (mg/L)	2.0-5.0
Zinc (mg/L)	0.2-1.0
Oil and Grease (mg/L)	10.0-15.0

TABLE 6

Air Quality Objectives - British Columbia

Air Contaminant	Objectives
<u>Sulphur Dioxide</u> ($\mu\text{g}/\text{m}^3$)	450-900
1 hour average	160-260
24 hour average	25-80
annual arithmetic mean	
<u>Particulates</u>	
a) <u>Suspended</u> ($\mu\text{g}/\text{m}^3$)	150-200
24 hour average	60-70
annual geometric mean	
b) <u>Dustfall</u> ($\mu\text{g}/100 \text{ cm}^3$)	1.7-2.9
Over a 30 day period	
<u>Carbon Monoxide</u> (mg/m^3)	5.2-35.0
1 hour average	5.8-15.2
8 hour average	-
24 hour average	
<u>Oxidants (ozone)</u> ($\mu\text{g}/\text{m}^3$)	-
1 hour average	-
24 hour average	-
annual arithmetic mean	
<u>Nitrogen Dioxide</u> ($\mu\text{g}/\text{m}^3$)	-
1 hour average	-
24 hour average	-
annual arithmetic mean	
<u>Hydrogen Sulphide</u> ($\mu\text{g}/\text{m}^3$)	7.1-42.4
1 hour average	-
2 hour average	3.5-7.1
24 hour average	
<u>Hydrogen Fluoride</u> ($\mu\text{g}/\text{m}^3$)	-
1 hour average	-
24 hour average	-
7 day average	-
30 day average	-
70 day average	
<u>Lead</u> ($\mu\text{g}/\text{m}^3$)	1-6
24 hour average	-
30 day geometric mean	2-3
annual geometric mean	

TABLE 7

Point Source Air Emission Concentration Levels

SO ₂ (mg/mol)	16-64
NO _x (mg/mol)	14-46
Total Particulate (mg/mol)	1.0-8.0
Sd (mg/mol)	0.16-0.27
As (mg/mol)	0.16-0.27
Asbestos (fibers/cm ³)	<2
Cd (mg/mol)	0.05-0.27
Cu (mg/mol)	0.16-0.27
Hf (mg/mol)	0.02-0.20
Pb (mg/mol)	0.16-0.27
Hg (mg/mol)	0.03-0.27
Opacity (%)	10-40
Zn (mg/mol)	0.16-0.027

PERSONAL COMMUNICATIONS

ONTARIO

W. Subock. Water Resource Branch. Ontario Ministry of Environment.

B. Martin. Air Resources Branch. Ontario Ministry of Environment.

MANITOBA

C. Moche. Water Pollution Control Branch. Manitoba Environmental Management.

A. Jackson. Air Pollution Control Branch. Manitoba Environmental Management.

SASKATCHEWAN

D. Waite. Water Pollution Control Branch. Saskatchewan Environment.

D. Nargang. Water Pollution Control Branch. Saskatchewan Environment.

L. Lechner. Air Pollution Control Branch. Saskatchewan Environment.

ALBERTA

L. Johnston. Environmental Protection Services. Alberta Department of the Environment.

J. Jaferi. Environmental Protection Services. Alberta Department of the Environment.

BRITISH COLUMBIA

H. Howie. Ministry of the Environment - British Columbia. Waste Management Branch.

APPENDIX A
SURVEY FORMS AND RESPONSES

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 14S023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Consolidated Bathurst Inc. Name of Plant: Same
Postal Address: Division Belgo Postal Address: _____
C.P. 850 Avenue Cascade _____
Shawinigan, Quebec G9N 6W5 _____

Please enter data or check as appropriate:

Location Code: 607

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1949	1937	1937	1981		
Design Capacity (lb/hr)		150,000	150,000	150,000	166,000		
Steam Conditions	Press. PSIG	130	130	130	130		
	Temp. °F	355	355	355	355		
Actual Pounds of Steam Generated in One Year ¹		296.1 x 10 ⁶ *	469.4 x 10 ⁶ *	67.4 x 10 ⁶ *	104.7 x 10 ⁶ *		
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	1,979,360*	3,299,000*	527,830*	675,310*		
	1982(Projected)	2,035,600*	3,392,700*	543,000*	694,480*		
	Beyond '82 (Projected)	3,033,000*	5,055,000*	809,000*	1,034,000*		
Please Specify Type of Oil Used		No. 6	No. 6	No. 6	No. 6		
Estimated Boiler Efficiency (%)		82%	78%	70%	85%		
Boiler's Original Fuel Design and Type	Oil, Watertube				X		
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized	X	X	X			
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		N/A	N/A	N/A	D		
Boiler Installation	Package				X		
	Field Erected	X	X	X			
Boiler Manufacturer		B&W	B&W	B&W	B&W		
Unit's Capacity Factor		.23	.36	.05	.07		

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: Pierre Spiek Position: Superintendent de la Chaudière Telephone: (819)536-3687

*Estimated breakdown of the totals given.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 145023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: <u>BASF Canada Inc.</u>	Name of Plant: <u>BASF Canada Inc.</u>
Postal Address: <u>5850 Cote Lease</u>	Postal Address: <u>Usine Laval</u>
<u>H4T 1C1</u>	<u>7275 Blvd. Levesque</u>
	<u>Laval, Quebec H7A 1T1</u>

Please enter data or check as appropriate:

Location Code: 609

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation			1972	1975			
Design Capacity (lb/hr)			180,000	135,000			
Steam Conditions	Press. PSIG		550	550			
	Temp. °F		660	750			
Actual Pounds of Steam Generated in One Year ¹			33.3 x 10 ⁶ *	29.3 x 10 ⁶ *			
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980		214,688	188,630			
	1982(Projected)		98,300	285,500			
	Beyond '82 (Projected)		49,000	142,000			
Please Specify Type of Oil Used			No. 6	No. 6			
Estimated Boiler Efficiency (%)			85%	85%			
Boiler's Original Fuel Design and Type	Oil, Watertube		X	X			
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.			A	D			
Boiler Installation	Package		X	X			
	Field Erected						
Boiler Manufacturer			C.E.	Vicker's			
Unit's Capacity Factor			.02	.02			

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: Yves Lemay Position: Surveillant Centrale Thermique Telephone: (514)325-3706

*Estimated by Monenco on the basis of annual oil consumption rate.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 145021440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: BATO

Name of Plant: F.F. Sourcy Inc.

Postal Address: _____

Postal Address: 191 Delage

Riviere du Loup, Quebec

G5R 3Z1

Please enter data or check as appropriate:

Location Code: 620

		1	2	3	4	5	6
Steam Generator Unit No.							
Year of First Commercial Operation			1975	1980	1981		
Design Capacity (lb/hr)			142,000	56,800	56,800		
Conditions	Steam Press. PSIG		160	160	160		
	Temp. °F		371	371	371		
Actual Pounds of Steam Generated in One Year ¹			460 x 10 ⁶ *	35.5 x 10 ⁶ *	34.4 x 10 ⁶ *		
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980		2,961,000	282,450	273,200		
	1982(Projected)		2,200,000	60,492	61,600		
	Beyond '82 (Projected)		Same	Same	Same		
Please Specify Type of Oil Used			No. 6	No. 6	No. 6		
Estimated Boiler Efficiency (%)			74%	69%	69%		
Boiler's Original Fuel Design and Type	Oil, Watertube		X	X	X		
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify			Wood Chips	Wood Chips		
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.			D	D	D		
Boiler Installation	Package		X	X	X		
	Field Erected						
Boiler Manufacturer			B&W	B&W	B&W		
Unit's Capacity Factor			.37	.07	.07		

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: R. Michauer Position: Surveillant, Centrale Thermique Telephone: (418)862-6941

*Estimated by Monenco on the basis of annual oil consumption rates.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 145023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Consolidated Bathurst Inc. Name of Plant: _____
Postal Address: P.O. Box 69 Postal Address: Laurentide Division
Montreal, Quebec Grand Mire, Quebec
H3C 2R5 G9T 5L2

Please enter data or check as appropriate:

Location Code: 622

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation					1966	1970	
Design Capacity (lb/hr)					208,000	311,000	
Steam	Press. PSIG				160	160	
Conditions	Temp. °F				370	370	
Actual Pounds of Steam Generated in One Year ¹					1,102.5 x 10 ⁶ *	277.4 x 10 ⁶ *	
Annual Oil-Consumption Rate (Imp. Gals./yr.)	1980				6,950,000	1,728,000	
	1982(Projected)				6,160,000	1,540,000	
	Beyond '82 (Projected)				4,400,000	1,320,000	
Please Specify Type of Oil Used					No. 6	No. 6	
Estimated Boiler Efficiency (%)					87%	88%	
Boiler's Original Fuel Design and Type	Oil, Watertube				X	X	
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify				Bark		
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.							
Boiler Installation	Package						
	Field Erected				X	X	
Boiler Manufacturer					F.W.	F.W.	
Unit's Capacity Factor					.61	.10	

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: A. Huard Position: Superintendent Telephone: (819)538-3341

*Estimated by Monenco on the basis of annual oil consumption rates.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 145023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Rolland Inc. Name of Plant: St. Jerome
Postal Address: P.O. Box 850 Postal Address: _____
St. Jerome, Quebec _____
J7Z 5V6 _____

Please enter data or check as appropriate:

Location Code: 614

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation					1959	1967	
Design Capacity (lb/hr)					71,000	125,000	
Steam Conditions	Press. PSIG				135	135	
	Temp. °F				358	358	
Actual Pounds of Steam Generated in One Year ¹					284.1 x 10 ⁶	535.2 x 10 ⁶	
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980				1,725,000	3,150,000	
	1982(Projected)				1,700,000	3,100,000	
	Beyond '82 (Projected)				Same	Same	
Please Specify Type of Oil Used					No. 6	No. 6	
Estimated Boiler Efficiency (%)					85%	85%	
Boiler's Original Fuel Design and Type	Oil, Watertube				X	X	
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.					N/A	N/A	
Boiler Installation	Package						
	Field Erected				X	X	
Boiler Manufacturer					F.W.	B&W	
Unit's Capacity Factor					.46	.49	

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: J.C. Lachance Position: Chief Engineer Telephone: (514)436-4140

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 165023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: <u>Kruger Inc.</u>	Name of Plant: <u>Kruger Inc.</u>
Postal Address: <u>Bedford Road</u>	Postal Address: <u>P.O. Box 100</u>
<u>Montreal, Quebec</u>	<u>Bromptonville, Quebec</u>

Please enter data or check as appropriate:

Location Code: 613

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1956	1960				
Design Capacity (lb/hr)		75,000	120,000				
Conditions	Steam Press. PSIG	160	160				
	Temp. °F	450	450				
Actual Pounds of Steam Generated in One Year ¹		413.7 x 10 ⁶ *	628.3 x 10 ⁶ *				
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	2,800,000	4,200,000				
	1982(Projected)	Same	Same				
	Beyond '82 (Projected)	Same	Same				
Please Specify Type of Oil Used		No. 6	No. 6				
Estimated Boiler Efficiency (%)		81%	82%				
Boiler's Original Fuel Design and Type	Oil, Watertube	X	X				
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		N/A	N/A				
Boiler Installation	Package						
	Field Erected	X	X				
Boiler Manufacturer		C.E.	C.E.				
Unit's Capacity Factor		.63	.60				

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: R. Tessier Position: Superintendent Telephone: (819)846-2721

*Estimated by Monenco on the basis of annual oil consumption rates.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 1450/21440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: C.I.P. Inc. Name of Plant: _____
Postal Address: 90 Parc Industriel Postal Address: _____
Matane, Quebec _____
C4W 3M9 _____

Please enter data or check as appropriate:

Location Code: 612

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1967	1967				
Design Capacity (lb/hr)		80,000	80,000				
Steam Conditions	Press. PSIG	225	225				
	Temp. °F	390	390				
Actual Pounds of Steam Generated in One Year ¹		335.3 x 10 ⁶ *	335.3 x 10 ⁶ *				
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	2,162,500	2,162,500				
	1982(Projected)	2,366,022	2,366,022				
	Beyond '82 (Projected)	2,000,000	2,000,000				
Please Specify Type of Oil Used		No. 6	No. 6				
Estimated Boiler Efficiency (%)		85%	85%				
Boiler's Original Fuel Design and Type	Oil, Watertube	X	X				
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		D	D				
Boiler Installation	Package	X	X				
	Field Erected						
Boiler Manufacturer		B&W	B&W				
Unit's Capacity Factor		.48	.48				

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: C. Camuel Position: Designer Telephone: (418)566-2266

*Estimated by Monenco on the basis of annual oil consumption rates.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 145021440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: <u>Consolidated Bathurst Inc.</u>	Name of Plant: _____
Postal Address: <u>C.P. 69</u>	Postal Address: <u>Div. Wayagamack</u>
<u>Montreal, Quebec</u>	<u>C.P. 128</u>
<u>H3C 2M5</u>	<u>Trois Rivières, Quebec</u>

Please enter data or check as appropriate:

Location Code: 610

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1938	1938	1949			
Design Capacity (lb/hr)		120,000	120,000	150,000			
Conditions	Steam Press. PSIG	172	172	172			
	Temp. °F	375	375	375			
Actual Pounds of Steam Generated in One Year ¹		420. x 10 ⁶ *	420. x 10 ⁶ *	523.6 x 10 ⁶ *			
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	2,870,400	2,870,400	3,588,000			
	1982(Projected)	2,152,000	2,152,000	2,690,000			
	Beyond '82 (Projected)	1,883,000	1,883,000	2,353,750			
Please Specify Type of Oil Used		No. 6	No. 6	No. 6			
Estimated Boiler Efficiency (%)		80%	80%	80%			
Boiler's Original Fuel Design and Type	Oil, Watertube						
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized	X	X	X			
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		N/A	N/A	N/A			
Boiler Installation	Package						
	Field Erected	X	X	X			
Boiler Manufacturer		B&W	B&W	C.E.			
Unit's Capacity Factor		.40	.40	.40			

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: A. Andrews Position: Plant Engineer Telephone: (819) 373-9241

*Estimated breakdown of the totals given.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 145023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: <u>Agropur</u>	Name of Plant: <u>Bon-Consell</u>
Postal Address: <u>Co-operative Agro-Alimentaire</u>	Postal Address: <u>81 rue St. Felix</u>
<u>510 rue Principale</u>	<u>Bon-Consell, Quebec</u>
<u>Granby, Quebec J2G 7G2</u>	<u>JOC 1A0</u>
Please enter data or check as appropriate:	Location Code: 603

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1979					
Design Capacity (lb/hr)		100,000					
Steam	Press. PSIG	150					
Conditions	Temp. °F	365					
Actual Pounds of Steam Generated in One Year ¹		229 x 10 ⁶					
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	1,924,000					
	1982(Projected)	1,925,000					
	Beyond '82 (Projected)	Same					
Please Specify Type of Oil Used		No. 6					
Estimated Boiler Efficiency (%)		80%					
Boiler's Original Fuel Design and Type	Oil, Watertube	X					
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		D					
Boiler Installation	Package	X					
	Field Erected						
Boiler Manufacturer		B&W					
Unit's Capacity Factor		.26					

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: J.H. Gagnon Position: Project Engineer Telephone: (514)375-1991 Ext. 339

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 14S023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Union Carbide du Canada Name of Plant: Usine de Montreal Est.
Postal Address: 123 Eglinton East Postal Address: Produits Chimiques et Plastiques
Toronto, Ontario C.P. 700
M4P 1J3 Point-aux-Trembles, P.Q. H1B 5K8

Please enter data or check as appropriate:

Location Code: 507

		1	2	3	4	5	6
Steam Generator Unit No.							
Year of First Commercial Operation					1959	1982	
Design Capacity (lb/hr)					100,000	100,000	
Steam	Press. PSIG				430	430	
Conditions	Temp. °F				350	350	
Actual Pounds of Steam Generated in One Year ¹					211 x 10 ⁶ *	211 x 10 ⁶ *	
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980				1,540,000	1,540,000	
	1982(Projected)				Same	1,760,000	
	Beyond '82 (Projected)				Same	Same	
Please Specify Type of Oil Used					No. 6	No. 6	
Estimated Boiler Efficiency (%)					75%	85%	
Boiler's Original Fuel Design and Type	Oil, Watertube				X	X	
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify				Gas	Gas	
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.					D	D	
Boiler Installation	Package					X	
	Field Erected				X		
Boiler Manufacturer					B&W	F.W.	
Unit's Capacity Factor					.24	.24	

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: Claude Sam Position: Chief of Energy System Services Telephone: (514)645-5311

*Estimated by Monenco on the basis of annual oil consumption rates.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 14SQ23440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: <u>C.I.P. Inc.</u>	Name of Plant: <u>C.I.P. Gatineau</u>
Postal Address: _____	Postal Address: <u>79 Main Street</u>
	<u>Gatineau, Quebec</u>
	<u>8J9 4X6</u>

Please enter data or check as appropriate:

Location Code: 601

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1952	1947	1930	1930	1980	1969
Design Capacity (lb/hr)		200,000	200,000	136,000	136,000	145,000	300,000
Steam Conditions	Press. PSIG	200	200	200	200	300	225
	Temp. °F	437	387	437	437	470	500
Actual Pounds of Steam Generated in One Year ¹		701 x 10 ⁶ *	701 x 10 ⁶ *	350.4 x 10 ⁶ *	350.4 x 10 ⁶ *	420.5 x 10 ⁶ *	929 x 10 ⁶ *
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	5,200,000*	5,200,000*	2,600,000*	2,600,000*	3,120,000*	6,892,000*
	1982(Projected)	3,824,000*	3,824,000*	1,912,000*	1,912,000*	2,295,000*	5,068,800*
	Beyond '82 (Projected)	Same	Same	Same	Same	Same	Same
Please Specify Type of Oil Used		No. 6	No. 6	No. 6	No. 6	No. 6	No. 6
Estimated Boiler Efficiency (%)		83%	83%	80%	80%	85%	86.5%
Boiler's Original Fuel Design and Type	Oil, Watertube					X	X
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized	X	X	X	X		
	Other, Specify					Wood Refuse Gas	
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.							
Boiler Installation	Package						
	Field Erected	X	X	X	X	X	X
Boiler Manufacturer		C.E.	C.E.	F.W.	F.W.	F.W.	C.E.
Unit's Capacity Factor		.40	.40	.40	.40	.40	.40

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: R. Allion Position: Steam Plant Superintendent Telephone: (819)663-5331 Ext. 382

*Estimated breakdown of the given totals.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 148Q2 1640-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Agropur
Postal Address: Co-operative Agro-Alimentaire
510 rue Principale
Granby, Quebec J2G 7G2

Name of Plant: Granby
Postal Address: Same

Please enter data or check as appropriate:

Location Code: 604

		1	2	3	4	5	6
Steam Generator Unit No.							
Year of First Commercial Operation		1975					
Design Capacity (lb/hr)		63,000					
Conditions	Steam Press. PSIG	145					
	Temp. °F	362					
Actual Pounds of Steam Generated in One Year ¹		74.8 x 10 ⁶					
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	627,000					
	1982(Projected)	620,000					
	Beyond '82 (Projected)	620,000					
Please Specify Type of Oil Used		No. 6					
Estimated Boiler Efficiency (%)		82%					
Boiler's Original Fuel Design and Type	Oil, Watertube	X					
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		D					
Boiler Installation	Package	X					
	Field Erected						
Boiler Manufacturer		Volcano					
Unit's Capacity Factor		.14					

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: J.M. Gagnon

Position: Project Engineer

Telephone: (514)375-1991 Ext. 339

**ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA**

DS5 CONTRACT 145023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: <u>Agropur</u>	Name of Plant: <u>Fromagerie de Granby</u>
Postal Address: <u>Co-operative Agro-Alimentaire</u>	Postal Address: <u>1100 Boul. Omer Deslauriers</u>
<u>510 rue Principale</u>	<u>Granby, Quebec</u>
<u>Granby, Quebec J2G 7G2</u>	<u>J2G 8C9</u>
	Location Code: <u>602</u>

Please enter data or check as appropriate:

		1	2	3	4	5	6
Steam Generator Unit No.							
Year of First Commercial Operation		1979	1979	1979			
Design Capacity (lb/hr)		76,000	76,000	76,000			
Conditions	Steam Press. PSIG	170	170	170			
	Temp. °F	375	375	375			
Actual Pounds of Steam Generated in One Year		63.3 x 10 ⁶	63.3 x 10 ⁶	63.3 x 10 ⁶			
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	423,400	423,400	423,400			
	1982(Projected)	450,000	450,000	450,000			
	Beyond '82 (Projected)	Same	Same	Same			
Please Specify Type of Oil Used		No. 6	No. 6	No. 6			
Estimated Boiler Efficiency (%)		82%	82%	82%			
Boiler's Original Fuel Design and Type	Oil, Watertube	X	X	X			
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		D	D	D			
Boiler Installation	Package	X	X	X			
	Field Erected						
Boiler Manufacturer		Volcano	Volcano	Volcano			
Unit's Capacity Factor		.10	.10	.10			

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: J.M. Gagnon

Position: Project Engineer

Telephone: (514)375-1991 Ext. 339

**ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA**

DSS CONTRACT 14S023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: C.I.P. Inc. Name of Plant: Moulin a Papier 658
Postal Address: C.P. 914 Postal Address: Same
La Tuque, P.Q.
C9X 3P8

Please enter data or check as appropriate:

Location Code: 605

Steam Generator Unit No.		11	12	3	4	5	6
Year of First Commercial Operation		1970	1976				
Design Capacity (lb/hr)		630,000	630,000				
Steam Conditions	Press. PSIG	250	250				
	Temp. °F	300	300				
Actual Pounds of Steam Generated in One Year ¹		2,016 x 10 ⁶	2,016 x 10 ⁶				
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	13,000,000	13,000,000				
	1982(Projected)	11,113,000	11,113,000				
	Beyond '82 (Projected)	Same	Same				
Please Specify Type of Oil Used		No. 6	No. 6				
Estimated Boiler Efficiency (%)		85%	85%				
Boiler's Original Fuel Design and Type	Oil, Watertube	X	X				
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		N/A	N/A				
Boiler Installation	Package						
	Field Erected	X	X				
Boiler Manufacturer		C.E.	C.E.				
Unit's Capacity Factor		.37	.37				

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: P. Guelbault Position: Assistant Superintendent Telephone: (819)521-5618

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 145021440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: St. Lawrence Sugar Name of Plant: _____
Postal Address: 4026 Notre-Dame St. East Postal Address: Same
Montreal, Quebec
HIW 2K3

Please enter data or check as appropriate:

Location Code: 606

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1954	1954	1954			
Design Capacity (lb/hr)		60,000	60,000	60,000			
Steam Conditions	Press. PSIG	115	115	115			
	Temp. °F	347	347	347			
Actual Pounds of Steam Generated in One Year ¹		48.6 x 10 ⁶ *	48.6 x 10 ⁶ *	48.6 x 10 ⁶ *			
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	333,000	333,000	333,000			
	1982(Projected)	233,000	233,000	233,000			
	Beyond '82 (Projected)	Same	Same	Same			
Please Specify Type of Oil Used		No. 6	No. 6	No. 6			
Estimated Boiler Efficiency (%)		80%	80%	80%			
Boiler's Original Fuel Design and Type	Oil, Watertube	X	X	X			
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify	Gas	Gas	Gas			
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		N/A	N/A	N/A			
Boiler Installation	Package						
	Field Erected	X	X	X			
Boiler Manufacturer		D.B.	D.B.	D.B.			
Unit's Capacity Factor		.09	.09	.09			

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: Bruce Foster Position: Project Manager Telephone: (514)527-8681 Ext. 157

*Estimated by Monenco on the basis of annual oil consumption rates.

**ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA**

DSS CONTRACT 145023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: <u>Donohue Inc.</u>	Name of Plant: <u>Donohue Inc.</u>
Postal Address: <u>Grande Allee</u>	Postal Address: <u>Clermont, P.Q.</u>
<u>Quebec, P.Q.</u>	<u>GOT 100</u>

Please enter data or check as appropriate:

Location Code: 608

		1	2	3	4	5	6
Steam Generator Unit No.							
Year of First Commercial Operation		1969	1967	1952	1960	1973	
Design Capacity (lb/hr)		180,000	60,000	80,000	80,000	150,000	
Steam Conditions	Press. PSIG	200	200	200	200	200	
	Temp. °F	390	388	388	388	388	
Actual Pounds of Steam Generated in One Year ¹		704.6 x 10 ⁶ *	250 x 10 ⁶ *	164.6 x 10 ⁶ *	76.5 x 10 ⁶ *	615.7 x 10 ⁶ *	
Annual Oil-Consumption Rate (Imp. Gals./yr.)	1980	4,828,000	1,670,000	1,100,000	524,000	4,218,630	
	1982(Projected)	4,800,000	1,600,000	1,000,000	500,000	4,200,000	
	Beyond '82 (Projected)	4,500,000	1,500,000	1,000,000	500,000	4,000,000	
Please Specify Type of Oil Used		No. 6	No. 6	No. 6	No. 6	No. 6	
Estimated Boiler Efficiency (%)		80%	82%	82%	80%*	80%*	
Boiler's Original Fuel Design and Type	Oil, Watertube	X	X	X	X	X	
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify				Bark		
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.							
Boiler Installation	Package		X			X	
	Field Erected	X		X	X		
Boiler Manufacturer		Vickers	F.W.	Vickers	F.W.	C.E.	
Unit's Capacity Factor		.45	.48	.23	.11	.47	

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: Claude Rochette Position: Central Heating Superintendent Telephone: (418)439-2833

*Estimated by Monenco on the basis of annual oil burn rate.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 145Q23440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: <u>Canadian National Railway</u>	Name of Plant: <u>Pointe St. Charles Shops</u>
Postal Address: <u>P.O. Box 8100</u>	Postal Address: <u>1830 Le ber St.</u>
<u>Montreal, Quebec</u>	<u>Montreal, Quebec</u>
<u>H3C 3N4</u>	<u>H3K 2A4</u>

Please enter data or check as appropriate:

Location Code: 611

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1966	1966				
Design Capacity (lb/hr)		183,600	183,600				
Steam	Press. PSIG	175	175				
Conditions	Temp. °F	428	428				
Actual Pounds of Steam Generated in One Year ¹		350 x 10 ⁶ a	350 x 10 ⁶ a				
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	2,335,450	2,335,450				
	1982(Projected)	2,361,400	2,361,400				
	Beyond '82 (Projected)	Same	Same				
Please Specify Type of Oil Used		No. 6	No. 6				
Estimated Boiler Efficiency (%)		82%	82%				
Boiler's Original Fuel Design and Type	Oil, Watertube						
	Oil, Firetube	X	X				
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		N/A	N/A				
Boiler Installation	Package						
	Field Erected	X	X				
Boiler Manufacturer		D.B.	D.B.				
Unit's Capacity Factor		.22	.22				

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: I. Khoury Position: Energy Conservation Co-ordinator Telephone: (514)877-5591

^aEstimated by Minenco on the basis of annual oil consumption rates.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

USC CONTRACT 145Q23440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Abitibi Price Ltd. Name of Plant: _____
Postal Address: Beaupre Division Postal Address: _____
Beaupre, Quebec _____
GOA 1EO _____

Please enter data or check as appropriate:

Location Code: 615

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1927	1927	1927			
Design Capacity (lb/hr)		65,000	65,000	75,000			
Steam	Press. PSIG	225	225	225			
Conditions	Temp. °F	500	500	510			
Actual Pounds of Steam Generated in One Year ¹		354.6 x 10 ⁶	350.1 x 10 ⁶	149.9 x 10 ⁶			
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	2,491,200	2,389,000	1,080,000			
	1982(Projected)	Same	Same	Same			
	Beyond '82 (Projected)	Same	Same	Same			
Please Specify Type of Oil Used		No. 6	No. 6	No. 6			
Estimated Boiler Efficiency (%)		80%	80%	75%			
Boiler's Original Fuel Design and Type	Oil, Watertube	X	X	X			
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify			Bark and Sludge			
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		N/A	N/A	N/A			
Boiler Installation	Package						
	Field Erected	X	X	X			
Boiler Manufacturer		Kidwell	Kidwell	Kidwell			
Unit's Capacity Factor		.62	.61	.23			

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: M. Brannen Position: Steam Plant Superintendent Telephone: (418)827-1731

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 14N021440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: C.I.L. Inc. Name of Plant: Usine De Chloralcalis De Beccancour
Postal Address: 90 East Sheppard Postal Address: C.P. 10
North York, Ontario Beccancour, Quebec
G0X 1B0
Please enter data or check as appropriate: Location Code: 616

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1973	1975	1975	1979	1979	
Design Capacity (lb/hr)		58,400	55,400	53,400	68,820	66,000	
Steam Conditions	Press. PSIG	180	180	180	180	180	
	Temp. °F	420	420	420	420	420	
Actual Pounds of Steam Generated in One Year ¹		63.3 x 10 ⁶	45 x 10 ⁶	300 x 10 ⁶	320 x 10 ⁶	320 x 10 ⁶	
Annual Oil-Consumption Rate (Imp. Gals./yr.)	1980	412,670	301,800	1,940,000	2,067,000	1,996,000	
	1982(Projected)	Same	Same	Same	Same	Same	
	Beyond '82 (Projected)	Same	Same	2,658,000	2,734,000	2,734,000	
Please Specify Type of Oil Used		No. 6	No. 6	No. 6	No. 6	No. 6	
Estimated Boiler Efficiency (%)		84%	82%	85%	84%	87%	
Boiler's Original Fuel Design and Type	Oil, Watertube	X	X	X	X	X	
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify	Hydrogen			Hydrogen	Hydrogen	
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		D	D	D	D	D	
Boiler Installation	Package	X	X	X	X	X	
	Field Erected						
Boiler Manufacturer		B&W	B&W	B&W	B&W	B&W	
Unit's Capacity Factor		.12	.09	.62	.53	.55	

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: D. Reinego Position: Process Engineer Telephone: (819)294-6633

*Estimated by Reinego on the basis of annual oil consumption rates.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DBS CONTRACT 14502 1450-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Catell Ltd Name of Plant: Catell/Usine Notre-Dame
Postal Address: _____ Postal Address: 6890 Notre Dame Est

Montreal, Quebec

H1N 2K9

Please enter data or check as appropriate:

Location Code: 617

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation			1972				
Design Capacity (lb/hr)			60,000				
Steam	Press. PSIG		200				
Conditions	Temp. °F		350				
Actual Pounds of Steam Generated in One Year ¹			42.1 x 10 ⁶				
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980		288,665				
	1982(Projected)		313,483				
	Beyond '82 (Projected)		308,000				
Please Specify Type of Oil Used			No. 6				
Estimated Boiler Efficiency (%)			80%				
Boiler's Original Fuel Design and Type	Oil, Watertube		X				
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify		Gas				
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.			D				
Boiler Installation	Package						
	Field Erected		X				
Boiler Manufacturer			Vickers				
Unit's Capacity Factor			.08				

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: V. Hanna Position: Plant Engineer Telephone: (514)256-1601 Ext. 179

¹Estimated by Bureau on the basis of annual oil consumption rates.

**ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA**

DSS CONTRACT 14S02J440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: <u>C.I.P. Inc.</u>	Name of Plant: <u>Trois-Rivieres (No. 16)</u>
Postal Address: <u>Edifice Sun Life</u>	Postal Address: <u>Rue des Commissaires</u>
<u>Montreal, Quebec</u>	<u>Trois-Rivieres, Quebec</u>
<u>H3B 2X1</u>	

Please enter data or check as appropriate:

Location Code: 619

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1926	1926	1926	1926	1926	1926
Design Capacity (lb/hr)		80,000	80,000	80,000	80,000	80,000	80,000
Conditions	Steam Press. PSIG	180	180	180	180	180	180
	Temp. °F	450	450	450	450	450	450
Actual Pounds of Steam Generated in One Year ¹		508 x 10 ⁶ *	508 x 10 ⁶ *	508 x 10 ⁶ *	508 x 10 ⁶ *	508 x 10 ⁶ *	508 x 10 ⁶ *
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	3,500,000*	3,500,000*	3,500,000*	3,500,000*	3,500,000*	3,500,000*
	1982(Projected)	Same	Same	Same	Same	Same	Same
	Beyond '82 (Projected)	Same	Same	Same	Same	Same	Same
Please Specify Type of Oil Used		No. 6	No. 6	No. 6	No. 6	No. 6	No. 6
Estimated Boiler Efficiency (%)		82.5%	82.5%	82.5%	82.5%	82.5%	82.5%
Boiler's Original Fuel Design and Type	Oil, Watertube						
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized	X	X	X	X	X	X
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		N/A	N/A	N/A	N/A	N/A	N/A
Boiler Installation	Package						
	Field Erected	X	X	X	X	X	X
Boiler Manufacturer		B&W	B&W	B&W	B&W	B&W	B&W
Unit's Capacity Factor		.72	.72	.72	.72	.72	.72

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: L.P. Landry Position: Contramaitre Telephone: (819) 376-3701

*Estimated breakdown of the given totals.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 145q21540-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Societe d'electrolyse and Chimie Name of Plant: Jonquiere
Postal Address: Alcan Ltd. Postal Address: _____
C.P. 1500, Secteur Arvida _____
Jonquiere, Quebec _____

Please enter data or check as appropriate:

Location Code: 621

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1940	1941	1941	1941	1942	1942
Design Capacity (lb/hr)		131,000	131,000	131,000	131,000	131,000	131,000
Steam Conditions	Press. PSIG	200	200	200	200	200	200
	Temp. °F	388	388	388	388	388	388
Actual Pounds of Steam Generated in One Year ¹		300 x 10 ⁶ *	300 x 10 ⁶ *	300 x 10 ⁶ *	300 x 10 ⁶ *	300 x 10 ⁶ *	300 x 10 ⁶ *
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	1,964,000*	1,964,000*	1,964,000*	1,964,000*	1,964,00*	1,964,000*
	1982(Projected)	1,984,000*	1,984,000*	1,984,000*	1,984,000*	1,984,000*	1,984,000*
	Beyond '82 (Projected)	Same	Same	Same	Same	Same	Same
Please Specify Type of Oil Used		No. 6	No. 6	No. 6	No. 6	No. 6	No. 6
Estimated Boiler Efficiency (%)		82.5%	82.5%	82.5%	82.5%	82.5%	82.5%
Boiler's Original Fuel Design and Type	Oil, Watertube						
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized	X	X	X	X	X	X
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		N/A	N/A	N/A	N/A	N/A	N/A
Boiler Installation	Package						
	Field Erected	X	X	X	X	X	X
Boiler Manufacturer		C.E.	C.E.	C.E.	C.E.	C.E.	C.E.
Unit's Capacity Factor		.26	.26	.26	.26	.26	.26

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: All boilers are identical and were converted from coal to oil in 1950.

The above information was supplied by:

Name: J.P. Couture Position: Surveillant Telephone: (418)548-1121
Ext. 2691

*Estimated by Monenco on equal basis for each unit.

**ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA**

DSS CONTRACT 14592 1540-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: La Comp. James MacIsaac Co.

Name of Plant: _____

Postal Address: Ruckingham, Quebec

Postal Address: C.P. 400

JBL 2X3

Thurso, Quebec

JOX 380

Please enter data or check as appropriate:

Location Code: 623

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1957					
Design Capacity (lb/hr)		220,800					
Conditions	Steam Press. PSIG	450					
	Temp. °F	700					
Actual Pounds of Steam Generated in One Year ¹		1,168 x 10 ⁶					
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	8,000,000					
	1982(Projected)	8,000,000					
	Beyond '82 (Projected)	Same					
Please Specify Type of Oil Used		No. 6					
Estimated Boiler Efficiency (%)		80X*					
Boiler's Original Fuel Design and Type	Oil, Watertube						
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized	X					
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		N/A					
Boiler Installation	Package						
	Field Erected	X					
Boiler Manufacturer		C.E.					
Unit's Capacity Factor		.60					

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: R. Denis Position: Assistant Chief Engineer Telephone: (819)985-2733

* Estimated by Numeron on the basis of annual oil burn rate.

ASSESSMENT OF POTENTIAL OIL-LOGGED MIXTURE
FUEL UTILIZATION IN CANADA

DNR CONTRACT 145021440-1-9000
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Laval University Name of Plant: Central Heating
Postal Address: C.P. 2208 Postal Address: _____
Ste. Foy, Quebec
CIR 7F6

Location Code: 824

Please enter data or check as appropriate:

		1	2	3	4	5	6
Steam Generator Unit No.							
Year of First Commercial Operation		1952	1970	1965			
Design Capacity (lb/hr)		50,000	150,000	100,090			
Steam	Press. PSIG	125	175	125			
Conditions	Temp. °F	353	353	353			
Actual Pounds of Steam Generated in One Year ¹		80. x 10 ⁶	240 x 10 ⁶	160 x 10 ⁶			
Annual Oil-Consumption Rate (Imp. Gals./yr.)	1980	552,173	1,656,520	1,104,346			
	1982(Projected)	583,300	1,750,000	1,167,000			
	Beyond '82 (Projected)	500,000	1,500,000	1,000,000			
Please Specify Type of Oil Used		No. 6	No. 6	No. 6			
Estimated Boiler Efficiency (%)		85%	88%	87%			
Boiler's Original Fuel Design and Type	Oil, Watertube	X	X	X			
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type D, Type B, etc.		D	D	D			
Boiler Installation	Package						
	Field Erected	X	X	X			
Boiler Manufacturer		D.B.	D.B.	D.B.			
Unit's Capacity Factor		.18	.18	.18			

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: P. Laporte Position: Responsable des Réseaux de distribution Telephone: (418)656-2661

* Estimated by Danesco on the basis of annual oil burn rates.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 145023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Schenley Canada Inc.
Postal Address: 1 Salabuy
Valley Field, Quebec
J6T 2G9

Name of Plant: _____
Postal Address: _____

Please enter data or check as appropriate:

Location Code: 426

Steam Generator Unit No.	1	2	3	4	5	6
Year of First Commercial Operation			1964	1974		
Design Capacity (lb/hr)			55,000	55,000		
Steam	Press. PSIG		135	135		
Conditions	Temp. °F		350	350		
Actual Pounds of Steam Generated in One Year ¹			85 x 10 ⁶ *	85 x 10 ⁶ *		
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980		597,330*	597,330*		
	1982(Projected)		657,000*	657,000*		
	Beyond '82 (Projected)		Same	Same		
Please Specify Type of Oil Used			No. 6	No. 6		
Estimated Boiler Efficiency (%)			76%	76%		
Boiler's Original Fuel Design and Type	Oil, Watertube		X	X		
	Oil, Firetube					
	Coal, Stoker					
	Coal, Pulverized					
	Other, Specify		Gas	Gas		
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.			D	O		
Boiler Installation	Package		X	X		
	Field Erected					
Boiler Manufacturer			B&W	Erie City		
Unit's Capacity Factor			.18	.18		

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: N. Courtemanche Position: Co-ordinator Telephone: (516) 373-3230

*Estimated by Response on the basis of the information provided by the Owner.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 14S023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Gulf Canada Products Co. Name of Plant: Montreal East Refinery
Postal Address: 3501 Boulevard Postal Address: Same
Montreal East, Quebec
H3B 5R3

Please enter data or check as appropriate:

Location Code: 018

		2	6	10	4	9	6
Steam Generator Unit No.							
Year of First Commercial Operation		1957	1968	1979			
Design Capacity (lb/hr)		200,000	300,000	300,000			
Conditions	Steam Press. PSIG	610	610	610			
	Temp. °F	750	750	750			
Actual Pounds of Steam Generated in One Year ¹		413 x 10 ⁶ *	332.7 x 10 ⁶ *	391 x 10 ⁶ *			
Annual Oil-Consumption Rate (Imp. Gall./yr.)	1980	3,036,300*	2,120,000*	3,580,000*			
	1982 (Projected)	2,403,000*	1,670,000*	2,817,000*			
	Beyond '82 (Projected)	1,446,000*	1,020,000*	1,717,000*			
Please Specify Type of Oil Used		No. 6	No. 6	No. 6			
Estimated Boiler Efficiency (%)		74.3%	91.2%	90.3%			
Boiler's Original Fuel Design and Type	Oil, Watertube	X	X	X			
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type B, etc.		N/A	N/A	N/A			
Boiler Installation	Package						
	Field Erected	X	X	X			
Boiler Manufacturer		BAW	C.E.	C.E.			
Unit's Capacity Factor		.24	.13	.22			

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: Results deduced from the Gulf B&D study on boiler efficiency. Total gross heat release (MMBtu/hr) x 24 x 330 for each boiler.

The above information was supplied by:

Name: E. Poincass Position: Energy Advisor Telephone: (514)645-8711

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 145023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Consolidated Bathurst Inc.
Postal Address: 342, 1^e rue
Ville de la Baie, Quebec
G7B 3R2

Name of Plant: Port Alfred
Postal Address: Same

Please enter data or check as appropriate:

Location Code: 625

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1957	1957			1976	1982
Design Capacity (lb/hr)		183,000	183,000			120,000	192,000
Steam Conditions	Press. PSIG	150	150			150	150
	Temp. °F	366	366			366	366
Actual Pounds of Steam Generated in One Year ¹		344.3 x 10 ⁶ *	344.3 x 10 ⁶ *			364.5 x 10 ⁶ *	361.2 x 10 ⁶ *
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980						
	1982(Projected)	2,301,600*	2,301,600*			3,684,800*	2,329,700*
	Beyond '82 (Projected)	1,452,100*	1,452,100*			2,324,800*	1,469,850*
Please Specify Type of Oil Used		No. 6	No. 6			No. 6	No. 6
Estimated Boiler Efficiency (%)		82%	82%			84%	85%
Boiler's Original Fuel Design and Type	Oil, Watert					X	X
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized	X	X				
	Other, Specify	Refuse	Refuse				Refuse
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.							
Boiler Installation	Package					X	
	Field Erected	X	X				X
Boiler Manufacturer		B&W	B&W			B&W	B&W
Unit's Capacity Factor		.21	.21			.34	.21

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: R.M. Berube Position: Superintendent Telephone: (418)544-3361

*Estimated by Monenco on the basis of information provided by the Owner.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 14S023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Papier Kingsey Falls Inc. Name of Plant: _____
Postal Address: C.F. 150 Postal Address: Same
Kingsey Falls, Quebec
JOA 180

Please enter data or check as appropriate:

Location Code: 627

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1972					
Design Capacity (lb/hr)		54,000					
Conditions	Steam Press. PSIG	250					
	Temp. °F	405					
Actual Pounds of Steam Generated in One Year ¹		253.5 x 10 ⁶ *					
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	1,715,800					
	1982(Projected)	1,760,000					
	Beyond '82 (Projected)	Same					
Please Specify Type of Oil Used		No. 6					
Estimated Boiler Efficiency (%)		81%					
Boiler's Original Fuel Design and Type	Oil, Watertube	X					
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		D					
Boiler Installation	Package	X					
	Field Erected						
Boiler Manufacturer		Volcano					
Unit's Capacity Factor		.34					

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: A. Tremblay Position: Assistant Director or Production Telephone: (819)363-2245

*Estimated by Monenco on the basis of the annual oil consumption rate.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 145023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: General Motors of Canada Ltd.
Postal Address: Williams Street
Oshawa, Ontario
L1G 1K7

Name of Plant: North Power House
Postal Address: Same

Please enter data or check as appropriate:

Location Code: 308

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1938	1938	1978			
Design Capacity (lb/hr)		100,000	100,000	85,000			
Conditions	Steam Press. PSIG	150	150	150			
	Temp. °F	366	366	366			
Actual Pounds of Steam Generated in One Year ¹		137 x 10 ⁶	137 x 10 ⁶	33 x 10 ⁶			
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	960,000	960,000	210,000			
	1982(Projected)	319,000	319,000	69,780			
	Beyond '82 (Projected)	315,000	315,000	69,000			
Please Specify Type of Oil Used		No. 6	No. 6	No. 6			
Estimated Boiler Efficiency (%)		79%	79%	80%			
Boiler's Original Fuel Design and Type	Oil, Watertube			X			
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized	X	X				
	Other, Specify			Gas			
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.				D			
Boiler Installation	Package			X			
	Field Erected	X	X				
Boiler Manufacturer		B&W	B&W	B&W			
Unit's Capacity Factor		.18	.18	.04			

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: H. Thompson Position: Chief Engineer Telephone: (416)644-7430

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSE CONTRACT 148Q2J440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Rio Algom Ltd. Name of Plant: Quirke Mine
Postal Address: Box 1500 Postal Address: Box 1500
Elliot Lake, Ontario Elliot Lake, Ontario

Please enter data or check as appropriate:

Location Code: 501

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1977	1977				
Design Capacity (lb/hr)		60,000	60,000				
Steam	Press. PSIG	230	230				
Conditions	Temp. °F	395	395				
Actual Pounds of Steam Generated in One Year ¹		129.6 x 10 ⁶ *	311 x 10 ⁶ *				
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	888,000*	2,131,000*				
	1982(Projected)	Same	Same				
	Beyond '82 (Projected)	Same	Same				
Please Specify Type of Oil Used		No. 6	No. 6				
Estimated Boiler Efficiency (%)		80%	80%				
Boiler's Original Fuel Design and Type	Oil, Watertube	X	X				
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		D	D				
Boiler Installation	Package	X	X				
	Field Erected						
Boiler Manufacturer		F.W.	F.W.				
Unit's Capacity Factor		.25	.59				

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: D.E. Taylor Position: Chief Stationary Engineer Telephone: (705)848-2213 Ext. 230

*Estimated by Monenco on the basis of information supplied by the Owner.

**ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA**

DSS CONTRACT 14S02 1460-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: General Motors of Canada

Name of Plant: South Plant

Postal Address: _____

Postal Address: Park Rd. South

Oshawa, Ontario

LIG 1K7

Please enter data or check as appropriate:

Location Code: 320

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1972					
Design Capacity (lb/hr)		200,000					
Steam	Press. PSIG	160					
Conditions	Temp. °F	370					
Actual Pounds of Steam Generated in One Year ¹		280.6 x 10 ⁶					
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	1,853,000					
	1982(Projected)	1,500,000					
	Beyond '82 (Projected)	1,500,000					
Please Specify Type of Oil Used		No. 6					
Estimated Boiler Efficiency (%)		83%					
Boiler's Original Fuel Design and Type	Oil, Watertube	X					
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify	Gas					
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		N/A					
Boiler Installation	Package						
	Field Erected	X					
Boiler Manufacturer		F.W.					
Unit's Capacity Factor		.16					

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: J. Austin Position: Chief Engineer Telephone: (416)644-6531

* Estimated on the basis of annual oil consumption rate.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSE CONTRACT 14502 1540-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Gulf Canada Products Co. Name of Plant: Clarkson Refinery
Postal Address: 385 Southdown Road Postal Address: _____
Mississauga, Ontario _____
L5J 2Y3 _____

Please enter data or check as appropriate:

Location Code: 521

Steam Generator Unit No.		6	8	9	13	5	6
Year of First Commercial Operation		1961	1970	1978	1981		
Design Capacity (lb/hr)		165,000	300,000	400,000	300,000		
Steam Conditions	Press. PSIG	625	610	610	610		
	Temp. °F	750	750	750	750		
Actual Pounds of Steam Generated in One Year ¹		700 x 10 ⁶ *	910 x 10 ⁶ *	1,540 x 10 ⁶ *	910 x 10 ⁶ *		
Annual Oil Consumption Rate (Imp. Gals./yr.)	1980	4,919,300*	5,668,400*	9,703,000*	5,800,250*		
	1982(Projected)	Same	Same	Same	Same		
	Beyond '82 (Projected)	Same	Same	Same	Same		
Please Specify Type of Oil Used		No. 6	No. 6	No. 6	No. 6		
Estimated Boiler Efficiency (%)		78%	88%	87%	86%		
Boiler's Original Fuel Design and Type	Oil, Watertube	X	X	X	X		
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify	Gas & Co	Gas	Gas	Gas		
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.							
Boiler Installation	Package						
	Field Erected	X	X	X	X		
Boiler Manufacturer		G.E.	G.E.	F.W.	C.E.		
Unit's Capacity Factor		.48	.35	.44	.35		

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: Oil and gas firing vary throughout the year. The figures given are a rough approximation of the oil firing rate alone.

The above information was supplied by:

Name: Bill Palmer Position: Process Engineer Telephone: (416)822-6222 Ext. 525

*Estimated by Monenco on the basis of the information supplied by the Owner.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 14SQ23460-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Shell Canada Limited Name of Plant: Sarnia Mfg. Centre
Postal Address: Corunna, Ontario Postal Address: _____
NUN 1G0 _____

Please enter data or check as appropriate:

Location Code: 512

	1	2	3	4	5	6
Steam Generator Unit No.						
Year of First Commercial Operation				1973	1978	
Design Capacity (lb/hr)				300,000	300,000	
Steam Press. PSIG				650	650	
Conditions Temp. °F				750	750	
Actual Pounds of Steam Generated in One Year ¹				2,006 x 10 ⁶	2,006 x 10 ⁶	
Annual Oil-Consumption Rate (Imp.Gals./yr.)				14,365,700	14,365,700	
	1980			Same	Same	
	1982(Projected)			Same	Same	
	Beyond '82 (Projected)			Same	Same	
Please Specify Type of Oil Used						
Estimated Boiler Efficiency (%)				87.4	86.3	
Boiler's Original Fuel Design and Type	Oil, Watertube			X	X	
	Oil, Firetube					
	Coal, Stoker					
	Coal, Pulverized					
	Other, Specify			Ref. Gas	Ref. Gas	
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.				HU	HU	
Boiler Installation	Package					
	Field Erected			X	X	
Boiler Manufacturer				CE	CE	
Unit's Capacity Factor				.76	.76	

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: Projection of oil and steam demand for 82 or beyond is difficult. No increase is anticipated for 82 or beyond.

The above information was supplied by:

Name: J. Zelinski Position: Chief Operating Engineer Telephone: (519)862-1491 Ext. 243

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 14SQ2 1440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: <u>Westinghouse Canada Inc.</u>	Name of Plant: <u>Plant No. 2</u>
Postal Address: <u>Box 510</u>	Postal Address: <u>Aberdeen Avenue</u>
<u>Hamilton, Ontario</u>	<u>Hamilton, Ontario</u>
	<u>LBN 3K2</u>

Please enter data or check as appropriate:

Location Code: 510

		1	2	3	4	5	6
Steam Generator Unit No.							
Year of First Commercial Operation		1964					
Design Capacity (lb/hr)		60,000					
Conditions	Steam Press. PSIG	125					
	Temp. °F	353					
Actual Pounds of Steam Generated in One Year ¹		30.6 x 10 ⁶					
Annual Oil-Consumption Rate (Imp. Gals./yr.)	1980	200,000					
	1982 (Projected)	Same					
	Beyond '82 (Projected)	Same					
Please Specify Type of Oil Used		No. 6					
Estimated Boiler Efficiency (%)		82%					
Boiler's Original Fuel Design and Type	Oil, Watertube	X					
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		D					
Boiler Installation	Package	X					
	Field Erected						
Boiler Manufacturer		B&W					
Unit's Capacity Factor		.06					

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: M. Press Position: Supervisor Telephone: (416) 528-8811 Ext. 6123

* Estimated by Monenco

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 14502 1440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Rio Algom Ltd.
Postal Address: P.O. Box 1500
Elliot Lake, Ontario

Name of Plant: Stanleigh Mine
Postal Address: Same

Please enter data or check as appropriate:

Location Code: 511

		1	2	3	4	5	6
Steam Generator Unit No.							
Year of First Commercial Operation		1982	1982				
Design Capacity (lb/hr)		50,000	50,000				
Steam Conditions	Press. PSIG	125	125				
	Temp. °F	353	353				
Actual Pounds of Steam Generated in One Year ¹		521.2 x 10 ⁶ *	521.2 x 10 ⁶ *				
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	3,571,000*	3,571,000*				
	1982(Projected)	Same	Same				
	Beyond '82 (Projected)	Same	Same				
Please Specify Type of Oil Used		No. 6	No. 6				
Estimated Boiler Efficiency (%)		80%	80%				
Boiler's Original Fuel Design and Type	Oil, Watertube	X	X				
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		D	D				
Boiler Installation	Package	X	X				
	Field Erected						
Boiler Manufacturer		F.W.	F.W.				
Boiler Capacity Factor		.70*	.70*				

¹ If a typical figure, representative of figures recorded in recent years is requested.

Enter: No actual records of operation exist yet.

Source information was supplied by:

Barrell Smith

Position: Chief Stationary Eng.

Telephone: (705)461-2218

* Checked by Monroe

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSE CONTRACT 1450/21440-1-9080
TASK A2.21 INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: American Can Canada Inc. Name of Plant: American Can Canada Inc.
Postal Address: MILL Postal Address: Same
Marathon, Ontario
POT 2EO

Location Code: 513

Please enter data or check as appropriate:

		1	2	3	4	5	6
Steam Generator Unit No.							
Year of First Commercial Operation				1951			
Design Capacity (lb/hr)				125,000			
Steam Conditions	Press. PSIG			620			
	Temp. °F			715			
Actual Pounds of Steam Generated in One Year ¹				400 x 10 ⁶			
Annual Oil-Consumption Rate (Imp. Gals./yr.)	1960			2,517 x 10 ³			
	1962(Projected)			3,150 x 10 ³			
	Beyond '82 (Projected)			1,300 x 10 ³			
Please Specify Type of Oil Used				No. 6			
Estimated Boiler Efficiency (%)				85%			
Boiler's Original Fuel Design and Type	Oil, Watertube			X			
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify			Bark			
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.				VUX			
Boiler Installation	Package						
	Field Erected			X			
Boiler Manufacturer				CE			
Unit's Capacity Factor				.37			

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: J. Biduch Position: Utilities Supt. Telephone: (807) 229-1200 Ext. 181

* Estimated by Manufacturer

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

USS CONTRACT 145023440-1-9000
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Westinghouse Canada Inc.

Name of Plant: _____

Postal Address: Turbine & Gen. Division

Postal Address: Plant No. 1

Box 510

Hamilton, Ont. L8N 3K2

Please enter data or check as appropriate:

Location Code: 314

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1966	1966				
Design Capacity (lb/hr)		60,000	60,000				
Steam	Press. PSIG	250	250				
Conditions	Temp. °F	406	406				
Actual Pounds of Steam Generated in One Year ¹		73 x 10 ⁶	73 x 10 ⁶				
Annual Oil-Consumption Rate (Imp. Gals./yr.)	1980	300,000	300,000				
	1982(Projected)	450,000	450,000				
	Beyond '82 (Projected)	400,000	400,000				
Please Specify Type of Oil Used		No. 6	No. 6				
Estimated Boiler Efficiency (%)		80%	80%				
Boiler's Original Fuel Design and Type	Oil, Watertube	X	X				
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		D	D				
Boiler Installation	Package	X	X				
	Field Erected						
Boiler Manufacturer		B&W	B&W				
Unit's Capacity Factor		.14	.14				

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: Joe Sosnyak

Position: Chief Engineer

Telephone: (416) 528-8811

¹Estimated by Shawcor on the basis of annual oil consumption rates.

**ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA**

DHS CONTRACT 145023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Bunker Pine Pulpers Name of Plant: Same
Postal Address: P.O. Box 40 Postal Address: _____
Cornwall, Ontario _____
K6H 5S3 _____

Please enter date or check as appropriate:

Location code: 315

		11	2	3	4	5	6
Steam Generator Unit No.							
Year of First Commercial Operation		1939					
Design Capacity (lb/hr)		360,000					
Steam Conditions	Press. PSIG	190					
	Temp. °F	386					
Actual Pounds of Steam Generated in One Year ¹		773.3 x 10 ⁶					
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	1,521,923					
	1982(Projected)	3,000,000					
	Beyond '82 (Projected)	Depends on cost of gas					
Please Specify Type of Oil Used		No. 6					
Estimated Boiler Efficiency (%)		85%					
Boiler's Original Fuel Design and Type	Oil, Watertube						
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized	X					
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		Stirling					
Boiler Installation	Package						
	Field Erected	X					
Boiler Manufacturer		B&W					
Unit's Capacity Factor		.25					

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: H. Hyatt Position: Steam Plant Supt. Telephone: (613)932-6620

* Estimated by Maurice on the basis of annual oil consumption rate for 1982.

**ASSESSMENT OF POTENTIAL OIL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA**

DSS CONTRACT 145021440-1-9000
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Canada Starch Co., Inc. Name of Plant: Canada Starch Co., Inc.
Postal Address: _____ Postal Address: 800 James Street

Cardinal, Ontario

R0E 1E0

Please enter data or check as appropriate:

Location Code: 516

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1951	1971				
Design Capacity (lb/hr)		100,000	100,000				
Steam	Press. PSIG	130	130				
Conditions	Temp. °F	365	365				
Actual Pounds of Steam Generated in One Year ¹		450 x 10 ⁶	156 x 10 ⁶				
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	3,010,830	999,255				
	1982(Projected)	650,000	235,000				
	Beyond '82 (Projected)	650,000	235,000				
Please Specify Type of Oil Used		No. 6	No. 6				
Estimated Boiler Efficiency (%)		81.8	85.6				
Boiler's Original Fuel Design and Type	Oil, Watertube		X				
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized	X					
	Other, Specify	Gas	Gas				
Manufacturer's Boiler Type Designation, i.e. Type A, Type G, Type D, etc.		Integral Type F	D				
Boiler Installation	Package		X				
	Field Erected	X					
Boiler Manufacturer		B&W	P.W.				
Unit's Capacity Factor		.52	.18				

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: A.W. Jenkins Position: Chief Engineer Telephone: (613)557-5131

¹Estimated by Response on the basis of annual oil consumption rates.

ANNEXMENT DE PROJET DE LOI - L'ÉNERGIE
ÉNERGIE ÉLECTRIQUE EN CANADA

DMS CONTRACT 1500/1500-1-0000
TARE A2.21 INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: DEFACO Name of Plant: _____
Postal Address: 1100 Burlington Street Postal Address: _____
P.O. Box 400 _____
Hamilton, Ontario _____

Please enter data or check as appropriate:

Location Code: 517

Steam Generator Unit No.		1	2	3	4	5	10
Year of First Commercial Operation					1951	1951	1979
Design Capacity (lb/hr)					70,000	70,000	150,000
Conditions	Steam Press. PSIG				300	300	300
	Temp. °F				600	600	600
Actual Pounds of Steam Generated in One Year ¹					160 x 10 ⁶ *	146.5 x 10 ⁶ *	261.6 x 10 ⁶ *
Annual Oil-Consumption Rate (Imp. Gals./yr.)	1980				1,095,800	1,017,400	1,792,300
	1982 (Projected)				N/A	N/A	N/A
	Beyond '82 (Projected)				N/A	N/A	N/A
Please Specify Type of Oil Used					No. 6	No. 6	No. 6
Estimated Boiler Efficiency (%)					80.1%	80.1%	80%
Original Fuel Design and Type	Oil, Watertube				X	X	X
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify				BF Gas	BF Gas	
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.					D	D	O
Boiler Installation	Package						X
	Field Erected				X	X	
Boiler Manufacturer					B & W	B & W	ZurnKestube
Unit's Capacity Factor					.26	.24	.16

NOTE 1: A typical figure, representation of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: Frank Best Position: Asst. Chief Engineer Telephone: (416) 544-1741
Ext. 1847

*Estimated by Nomen on the basis of the annual oil burn rates.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 145023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: <u>Esso Petroleum Canada</u>	Name of Plant: <u>Sarnia Refinery</u>
Postal Address: _____	Postal Address: <u>P.O. Box 3004</u>
_____	<u>Sarnia, Ontario</u>
_____	<u>N7T 7M5</u>

Please enter data or check as appropriate:

Location Code: 518

Steam Generator Unit No.	F-501	F-502	F-503	F-504	5	6
Year of First Commercial Operation	1953	1953	1956	1958		
Design Capacity (lb/hr)	175,000	175,000	175,000	350,000		
Steam Conditions	Press. PSIG	725	725	725	725	
	Temp. °F	750	750	750	750	
Actual Pounds of Steam Generated in One Year ¹	1,163 X 10 ⁶ *	1,163 X 10 ⁶ *	1,163 X 10 ⁶ *	2,326 X 10 ⁶ *		
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980					
	1982(Projected)	7,680,000	7,680,000	7,680,000	15,360,000	
	Beyond '82 (Projected)	Same	Same	Same	Same	
Please Specify Type of Oil Used	No.6	No.6	No.6	No.6		
Estimated Boiler Efficiency (%)	83%	83%	83%	83%		
Boiler's Original Fuel Design and Type	Oil, Watertube	X	X	X	X	
	Oil, Firetube					
	Coal, Stoker					
	Coal, Pulverized					
	Other, Specify	Gas & Tar	Gas & Tar	Gas & Tar	Gas & Tar	
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.	D	D	D	D		
Boiler Installation	Package					
	Field Erected	X	X	X	X	
Boiler Manufacturer	B & W	B & W	B & W	B & W		
Unit's Capacity Factor	.76	.76	.76	.76		

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: R. Dennis Position: Chief Operating Engineer Telephone: (519)339-2115

* Estimated by Monenco on the basis of annual oil consumption rates provided.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 145023440-1-90W0
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: St. Lawrence Starch Co. Name of Plant: _____
Postal Address: 141 Lakeshore Road East Postal Address: Same
Port Credit, Ontario
L5C 1E8

Please enter data or check as appropriate:

Location Code: 509

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1954					
Design Capacity (lb/hr)		100,000					
Steam	Press. PSIG	250					
Conditions	Temp. °F	515					
Actual Pounds of Steam Generated in One Year ¹		214.5 x 10 ⁶ *					
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	1,400,000					
	1982(Projected)	Same					
	Beyond '82 (Projected)	Same					
Please Specify Type of Oil Used		C					
Estimated Boiler Efficiency (%)		84%					
Boiler's Original Fuel Design and Type	Oil, Watertube						
	Oil, Firetube						
	Coal, Stoker	X					
	Coal, Pulverized						
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		N/A					
Boiler Installation	Package						
	Field Erected	X					
Boiler Manufacturer		B&W					
Unit's Capacity Factor		.24					

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: The above boiler produces an average of 500,000 lb/day steam and consumes about 4000 gals of oil per day.

The above information was supplied by:

Name: D. Cowie Position: Power House Superintendent Telephone: (416)274-3671

*Estimated on the basis of annual oil consumption rate.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 14S02J440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Texaco (Canada) Inc.
Postal Address: 250 Lakeshore Road
Port Credit, Ontario
LSG 4M6

Name of Plant: _____
Postal Address: Same

Please enter data or check as appropriate:

Location Code: 506

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1963					
Design Capacity (lb/hr)		100,000					
Steam Conditions	Press. PSIG	150					
	Temp. °F	100					
Actual Pounds of Steam Generated in One Year ¹		432 x 10 ⁵					
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	2,786,000					
	1982(Projected)	Same					
	Beyond '82 (Projected)	Same					
Please Specify Type of Oil Used		No. 6					
Estimated Boiler Efficiency (%)		85%					
Boiler's Original Fuel Design and Type	Oil, Watertube	X					
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify	Gas					
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		N/A					
Boiler Installation	Package						
	Field Erected	X					
Boiler Manufacturer		F.W.					
Unit's Capacity Factor		.49					

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: The above unit is operated at an average rate of 40 to 60 klb/hr, all year round.

The above information was supplied by:

Name: I. Holmes Position: Plant Engineer Telephone: (416)278-5511

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

D&S CONTRACT 145023540-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Courtaulds Canada Inc. Name of Plant: Same
Postal Address: 1150 Montreal Road Postal Address: _____
Cornwall, Ontario _____
K6H 5S2 _____

Please enter data or check as appropriate:

Location Code: 505

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1976	1938	1938	1947	1948	1957
Design Capacity (lb/hr)		100,000	75,000	75,000	100,000	100,000	115,000
Steam Conditions	Press. PSIG	200	200	200	200	200	200
	Temp. °F	390	390	390	390	390	390
Actual Pounds of Steam Generated in One Year ¹		302.8 x 10 ⁶ *	100 x 10 ⁶	100 x 10 ⁶	302.8 x 10 ⁶ *	302.8 x 10 ⁶ *	302.8 x 10 ⁶ *
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	2,000,000	670,000	670,000	2,000,000	2,000,000	2,000,000
	1982(Projected)	Same	Same	Same	Same	Same	Same
	Beyond '82 (Projected)	Same	Same	Same	Same	Same	Same
Please Specify Type of Oil Used		No. 6	No. 6	No. 6	No. 6	No. 6	No. 6
Estimated Boiler Efficiency (%)		83%	78%	78%	80%	80%	81%
Boiler's Original Fuel Design and Type	Oil, Watertube	X					X
	Oil, Firetube						
	Coal, Stoker		X	X	X	X	
	Coal, Pulverized						
	Other, Specify	Gas					
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		D	N/A	N/A	N/A	N/A	D
Boiler Installation	Package	X					X
	Field Erected		X	X	X	X	
Boiler Manufacturer		B&W	B&W	B&W	B&W	B&W	B&W
Unit's Capacity Factor		.35	.15	.15	.35	.35	.30

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: W.T. Dinsmore Position: Services Superintendent Telephone: (613)932-2824

*Estimated by Monenco on the basis of annual oil consumption rates.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FULL UTILIZATION IN CANADA

USS CONTRACT 145023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: <u>C.I.L. Cornwall Chemicals</u>	Name of Plant: <u>Cornwall Chemicals</u>
Postal Address: <u>P.O. Box 609</u>	Postal Address: <u>Same</u>
<u>Cornwall, Ontario</u>	

Please enter data or check as appropriate:

Location Code: 504

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1979					
Design Capacity (lb/hr)		50,000					
Steam Conditions	Press. PSIG	300					
	Temp. °F	422					
Actual Pounds of Steam Generated in One Year ¹		48 x 10 ⁶					
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	368,207					
	1982(Projected)	375,000					
	Beyond '82 (Projected)	Same					
Please Specify Type of Oil Used		No. 6					
Estimated Boiler Efficiency (%)		84%					
Boiler's Original Fuel Design and Type	Oil, Watertube	X					
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		D					
Boiler Installation	Package	X					
	Field Erected						
Boiler Manufacturer		F.W.					
Unit's Capacity Factor		.11					

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: This boiler is used only as a back up for our natural gas-fired boiler and our steam generating CS₂ process. This boiler is normally shut down all summer.

The above information was supplied by:

Name: H. McCoy Position: Chief Engineer Telephone: (613)938-5222

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 14S(23440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: <u>E.B. Eddy Forest Products</u>	Name of Plant: <u>Hull and Ottawa Steam Plants**</u>
Postal Address: <u>P.O. Box 3521, 'C'</u>	Postal Address: <u>Same</u>
<u>Ottawa, Ontario</u>	
<u>K1Y 4L5</u>	

Please enter data or check as appropriate:

Location Code: 503

Steam Generator Unit No.		1 Ottawa	2 Ottawa	3 Ottawa	4 Hull	5 Hull	6
Year of First Commercial Operation		1944	1944	1957	1957	1967	
Design Capacity (lb/hr)		70,000	70,000	100,000	140,000	275,000	
Conditions	Steam Press. PSIG	190	190	190	260	290	
	Temp. °F	493	493	490	550	550	
Actual Pounds of Steam Generated in One Year ¹		92.9 x 10 ⁶	54.3 x 10 ⁶	472.4 x 10 ⁶	164.4 x 10 ⁶	782.5 x 10 ⁶ *	
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	579,806	335,503	3,171,710	1,019,709	1,800,458	
	1982(Projected)	558,900	300,000	4,264,872	790,584	8,947,166	
	Beyond '82 (Projected)	558,000	300,000	4,200,000	700,000	8,900,000	
Please Specify Type of Oil Used		No. 6	No. 6	No. 6	No. 6	No. 6	
Estimated Boiler Efficiency (%)		81%	81%	82%	82%	86%	
Boiler's Original Fuel Type	Oil, Watertube					X	
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized	X	X	X	X		
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		N/A	N/A	N/A	N/A	D	
Boiler Installation	Package						
	Field Erected	X	X	X	X	X	
Boiler Manufacturer		F.W.	F.W.	F.W.	B&W	F.W.	
Unit's Capacity Factor		.15	.09	.54	.13	.12	

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: Difference between 1980 oil consumption and projected 1982 beyond is due to burning oil and gas in 1980. 1981 to present we are using only oil, but still have the capability to use gas if economics warrant.

The above information was supplied by:

Name: _____ Position: _____ Telephone: _____

*Estimated by Monenco on the basis of annual oil consumption rates.

**The two plants have a joining steam line.

**ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA**

DSS CONTRACT 14SQZJ440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: <u>C.I.P. Inc.</u>	Name of Plant: <u>Hawkesbury Mill</u>
Postal Address: <u>1155 Metcalfe Street</u>	Postal Address: <u>229 Main Street West</u>
<u>Montreal, Quebec</u>	<u>Hawkesbury, Ontario</u>
	<u>K6A 2H5</u>

Please enter data or check as appropriate:

Location Code: 502

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1947	1973				
Design Capacity (lb/hr)		100,000	100,000				
Steam Conditions	Press. PSIG	150	150				
	Temp. °F	366	366				
Actual Pounds of Steam Generated in One Year ¹		691.2 x 10 ⁶	691.2 x 10 ⁶				
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	4,284,000	4,284,000				
	1982(Projected)	3,780,000	3,780,000				
	Beyond '82 (Projected)	Same	Same				
Please Specify Type of Oil Used		No. 6	No. 6				
Estimated Boiler Efficiency (%)		81%	82%				
Boiler's Original Fuel Design and Type	Oil, Watertube		X				
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized	X					
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		N/A	D				
Boiler Installation	Package		X				
	Field Erected	X					
Boiler Manufacturer		C.E.	B&W				
Unit's Capacity Factor		.79	.79				

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: Royal Renwick Position: Steam Plant Superintendent Telephone: (613)632-4121

**ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA**

DSS CONTRACT 145023440-1-9000
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Queen's University Name of Plant: Central Heating Plant
Postal Address: Kingston, Ontario Postal Address: Same
K7L 4V1

Location Code: 519

Please enter data or check as appropriate:

Steam Generator Unit No.		5	6	7	8	5	6
Year of First Commercial Operation		1963	1970	1974	1976		
Design Capacity (lb/hr)		50,000	150,000	150,000	150,000		
Steam Conditions	Press. PSIG	125	275	275	275		
	Temp. °F	353	414	414	414		
Actual Pounds of Steam Generated in One Year ¹		129 x 10 ⁶	325 x 10 ⁶	32 x 10 ⁶	235 x 10 ⁶		
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	0	566,380	189,000	580,200		
	1982(Projected)	807,222	1,831,200	189,000	1,851,200		
	Beyond '82 (Projected)	669,994	1,536,500	156,870	1,536,500		
Please Specify Type of Oil Used		No. 6	No. 6	No. 6	No. 6		
Estimated Boiler Efficiency (%)		81%	84%	84%	84%		
Boiler's Original Fuel Design and Type	Oil, Watertube	X	X	X	X		
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify	Gas	Gas		Gas		
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		D	D	D	D		
Boiler Installation	Package	X	X	X	X		
	Field Erected						
Boiler Manufacturer		F.W.	Keeler	F.W.	F.W.		
Unit's Capacity Factor		.29	.25	.03	.18		

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: All of the above boilers are presently running on 100% oil due to unstable gas prices.

Projections for 1982 or beyond are also based on 100% oil-firing.

The above information was supplied by:

Name: N.E. Goneru Position: Chief Operations Engineer Telephone: (613)547-5793

ASSESSMENT OF POTENTIAL COAL LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 14802 1440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Northern Canada Power Commission
Postal Address: 7909 - 51 Avenue
P.O. Box 5700, "L"
Edmonton, Alberta T6C 4J8

Name of Plant: _____
Postal Address: _____

Please enter data or check as appropriate:

Location Code: 801

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1971					
Design Capacity (lb/hr)		90,000					
Steam Conditions	Press. PSIG	220					
	Temp. °F	350					
Actual Pounds of Steam Generated in One Year ¹		300. x 10 ⁶					
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	2,155,691					
	1982(Projected)	2,362,600					
	Beyond '82 (Projected)	Same					
Please Specify Type of Oil Used		No. 6					
Estimated Boiler Efficiency (%)		85%					
Boiler's Original Fuel Design and Type	Oil, Watertube						
	Oil, Firetube	X					
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		N/A					
Boiler Installation	Package	X					
	Field Erected—						
Boiler Manufacturer		Volcano					
Unit's Capacity Factor		.38					

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: Town heating supply. This unit operates about 60% of a continuous year at about 60% of the rated output on the average.

The above information was supplied by:

Name: D.I. McGuiness Position: Engineering Manager Telephone: (403)465-3377

**ASSESSMENT OF POTENTIAL OIL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA**

DSS CONTRACT 14SQ23440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: MacMillan Bloedel Ltd.

Name of Plant: Port Alberni Plant

Postal Address: _____

Postal Address: _____

Port Alberni, B.C.

Please enter data or check as appropriate:

Location Code: 709

Steam Generator Unit No.		3	4				
Year of First Commercial Operation		1962	1977				
Design Capacity (lb/hr)		350,000	375,000				
Steam	Press. PSIG	600	600				
Conditions	Temp. °F	750	750				
Actual Pounds of Steam Generated in One Year ¹		312.7 x 10 ⁶ a	563.2 x 10 ⁶ a				
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	2,040,550	3,675,440				
	1982(Projected)	2,447,000	4,407,400				
	Beyond '82 (Projected)	Same	Same				
Please Specify Type of Oil Used		No. 6	No. 6				
Estimated Boiler Efficiency (%)		84%	84%				
Boiler's Original Fuel Design and Type	Oil, Watertube	X	X				
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify	Hog Fuel	Hog Fuel				
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.							
Boiler Installation	Package						
	Field Erected	X	X				
Boiler Manufacturer		B & W	C.E.				
Unit's Capacity Factor		.10	.17				

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: Eric Rohrer

Position: Operating Engineer

Telephone: () 723-2163
Ext. 458

* Estimated by Memenco on the basis of annual oil consumption rates.

**ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA**

DSS CONTRACT 145Q23440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: <u>Esso Minerals</u>	Name of Plant: <u>Granduc Mine</u>
Postal Address: <u>P.O. Box 190</u>	Postal Address: <u>Same</u>
<u>Stewart, British Columbia</u>	
<u>VOT 1W0</u>	

Please enter data or check as appropriate:

Location Code: 704

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1968	1968				
Design Capacity (lb/hr)		260,000	260,000				
Steam Conditions	Press. PSIG	600	600				
	Temp. °F	750	750				
Actual Pounds of Steam Generated in One Year ¹		365 x 10 ⁶	365 x 10 ⁶				
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	2,600,000	2,600,000				
	1982(Projected)	Same	Same				
	Beyond '82 (Projected)	Same	Same				
Please Specify Type of Oil Used		Bunker "C"	Bunker "C"				
Estimated Boiler Efficiency (%)		80%	80%				
Boiler's Original Fuel Design and Type	Oil, Watertube	X	X				
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify						
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		D	D				
Boiler Installation	Package						
	Field Erected	X	X				
Boiler Manufacturer		F.W.	F.W.				
Unit's Capacity Factor		.16	.16				

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: Brian MacInnis Position: Plant Superintendent Telephone: (604)636-2223

**ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA**

DSS CONTRACT 145023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: B.C.F.P. Name of Plant: Crofton Pulp & Paper
Postal Address: Box 70 Postal Address: _____
Crofton, B.C. _____

Please enter data or check as appropriate:

Location Code: 702

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1958	1958	1966	1978		
Design Capacity (lb/hr)		200,000	200,000	300,000	550,000		
Steam	Press. PSIG	625	625	625	625		
Conditions	Temp. °F	750	750	750	750		
Actual Pounds of Steam Generated in One Year ¹		554.8 x 10 ⁶	48.2 x 10 ⁶	144 x 10 ⁶	1,547.8x10 ⁶		
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	3,577,686*	310,853*	928,640*	9,532,820*		
	1982(Projected)	3,054,122*	265,362*	792,741*	8,137,773*		
	Beyond '82 (Projected)	2,742,480*	238,284*	711,850*	7,307,400*		
Please Specify Type of Oil Used		No. 6	No. 6	No. 6	No. 6		
Estimated Boiler Efficiency (%)		85%	85%	85%	85%		
Boiler's Original Fuel Design and Type	Oil, Watertube	X	X	X	X		
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify	HOG	HOG		HOG		
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.							
Boiler Installation	Package						
	Field Erected	X	X	X	X		
Boiler Manufacturer		F.W.	F.W.	F.W.	F.W.		
Unit's Capacity Factor		.31	.03	.05	.32		

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: John Albertson Position: P & R Supt. Telephone: (604)246-3241

* Estimated by Monenco on the basis of each unit's annual steam generation ratio over the total rating.

**ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA**

DSS CONTRACT 145023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Tahsis Co.
Postal Address: Box 1000
Gold River, B.C.
VOP 1G7

Name of Plant: Gold River Pulp Mill
Postal Address: Box 1000
Gold River, B.C.
VOP 1G7

Please enter data or check as appropriate:

Location Code: 701

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1967					
Design Capacity (lb/hr)		525,000					
Conditions	Steam Press. PSIG	625					
	Temp. °F	750					
Actual Pounds of Steam Generated in One Year ¹		656.7 x 10 ⁶ *					
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	4.5 x 10 ⁶					
	1982(Projected)	4.5 x 10 ⁶					
	Beyond '82 (Projected)	4.5 x 10 ⁶					
Please Specify Type of Oil Used		Bunker "C"					
Estimated Boiler Efficiency (%)		56%					
Boiler's Original Fuel Design and Type	Oil, Watertube						
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify	Wood-firing					
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.							
Boiler Installation	Package						
	Field Erected	X					
Boiler Manufacturer		F.W.					
Unit's Capacity Factor		.14					

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: I.R. Smith Position: Steam & Recovery Supt. Telephone: (604)283-2261

* Estimated by Monenco on the basis of annual oil consumption rate.

**ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA**

DSS CONTRACT 145023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Western Forest Products Ltd. Name of Plant: Squamish Division
Postal Address: 1111 West Georgia Street Postal Address: Box 5000
Vancouver, B.C. Squamish, B.C.
V6E 3H1 VON 3G0
Please enter data or check as appropriate: Location Code: 703

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1966	1981				
Design Capacity (lb/hr)		140,000	250,000				
Steam Conditions	Press. PSIG	600	600				
	Temp. °F	750	750				
Actual Pounds of Steam Generated in One Year ¹		1,129 x 10 ⁶ *	741.8 x 10 ⁶ *				
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	7,738,000	4,642,000				
	1982(Projected)	Same	Same				
	Beyond '82 (Projected)	Same	Same				
Please Specify Type of Oil Used		No. 6	No. 6				
Estimated Boiler Efficiency (%)		80%	87.6%				
Boiler's Original Fuel Design and Type	Oil, Watertube	X	X				
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify	HOG/Oil					
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.							
Boiler Installation	Package						
	Field Erected	X	X				
Boiler Manufacturer		B&W	Zurn				
Unit's Capacity Factor		.92	.34				

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: S.J. Greig Position: Manager, Pulp Operations Telephone: (604)684-0151

* Estimated by Monenco on the basis of annual oil consumption rate.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 14S023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: Canadian Forest Products Ltd. Name of Plant: Howe Sound Pulp Division
Postal Address: 2800 - 1055 Dunsmuir Street Postal Address: Port Mellon, British Columbia
P.O. Box 49420, Bentall Postal Station VON 2S0
Vancouver, British Columbia

Please enter data or check as appropriate:

Location Code: 706

		1	2	3	4	5	6
Steam Generator Unit No.							
Year of First Commercial Operation		1962	1962				
Design Capacity (lb/hr)		220,000	220,000				
Steam Conditions	Press. PSIG	400	400				
	Temp. °F	550	550				
Actual Pounds of Steam Generated in One Year ¹		397.7 x 10 ⁶ *	397.7 x 10 ⁶ *				
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	2,725,000	2,725,000				
	1982(Projected)	1,925,000	1,925,000				
	Beyond '82 (Projected)	1,750,000	1,750,000				
Please Specify Type of Oil Used		No. 6	No. 6				
Estimated Boiler Efficiency (%)		80%	80%				
Boiler's Original Fuel Design and Type	Oil, Watertube	X	X				
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify	Hog fuel	Hog fuel				
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		N/A	N/A				
Boiler Installation	Package						
	Field Erected	X	X				
Boiler Manufacturer		B&W	B&W				
Unit's Capacity Factor		.21	.21				

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: Boilers operate on hog fuel and oil. Burners are new and can utilize oil or natural gas.

The above information was supplied by:

Name: R.C. Chalmers Position: Process Engineer Telephone: (604)884-5423 Ext. 312

*Estimated by Monenco on the basis of annual oil consumption rates.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 14S023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: <u>Crown Zellerbach Canada Ltd.</u>	Name of Plant: <u>Elk Falls Mill</u>
Postal Address: <u>P.O. Box 2000</u>	Postal Address: <u>Same</u>
<u>Campbell River, British Columbia</u>	
<u>V9W 5C9</u>	

Please enter data or check as appropriate:

Location Code: 707

Steam Generator Unit No.		1	2	3	4	5	6
Year of First Commercial Operation		1952	1952	1963	1967		
Design Capacity (lb/hr)		120,000	120,000	175,000	400,000		
Steam Conditions	Press. PSIG	675	675	680	725		
	Temp. °F	675	675	675	700		
Actual Pounds of Steam Generated in One Year ¹		229.7 x 10 ⁶ *	219.5 x 10 ⁶ *	392.9 x 10 ⁶ *	3,069.3x10 ⁶ *		
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	1,573,690	1,503,750	2,692,760	4,576,700		
	1982(Projected)	874,270	874,270	1,643,630	19,793,480		
	Beyond '82 (Projected)	Same	Same	Same	Same		
Please Specify Type of Oil Used		No. 6	No. 6	No. 6	No. 6		
Estimated Boiler Efficiency (%)		80%	80%	80%	85%		
Boiler's Original Fuel Design and Type	Oil, Watertube	X	X	X	X		
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify	Hog	Hog	Hog			
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		N/A	N/A	N/A	N/A		
Boiler Installation	Package						
	Field Erected	X	X	X	X		
Boiler Manufacturer		C.E.	C.E.	B&W	B&W		
Unit's Capacity Factor		.22	.21	.26	.88		

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: J.M. Beaman Position: Steam Plant Superintendent Telephone: (604)287-7411

* Estimated on the basis of annual oil consumption rate.

CONFIDENTIAL

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 14S023440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: MacMillan Bloedel Ltd.

Name of Plant: Powell River Division

Postal Address: _____

Postal Address: 6270 Yew Street

Powell River, British Columbia

V8A 4Z7

Please enter data or check as appropriate:

Location Code: 705

Steam Generator Unit No.		1	2	5	6
Year of First Commercial Operation					
Design Capacity (lb/hr)					
Steam	Press. PSIG				
Conditions	Temp. °F				
Actual Pounds of Steam Generated in One Year ¹					
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980				
	1982(Projected)				
	Beyond '82 (Projected)				
Please Specify Type of Oil Used					
Estimated Boiler Efficiency (%)					
Boiler's Original Fuel Design and Type	Oil, Watertube				
	Oil, Firetube				
	Coal, Stoker				
	Coal, Pulverized				
	Other, Specify				
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.					
Boiler Installation	Package				
	Field Erected				
Boiler Manufacturer					
Unit's Capacity Factor					

INFORMATION
CLASSIFIED
AS
CONFIDENTIAL
DUE TO
OWNER'S
REQUEST

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: L. Ryan Position: Asst. Steam Plant Superintendent Telephone: (604)483-3722

*Estimated by Monenco on the basis of annual oil consumption rates.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 14SQ23440-1-9080
TASK A2.2: INDUSTRIAL OIL-FIRED BOILERS

PHASE III - CANADA

Name of Company: MacMillan Bloedel Name of Plant: Harmac Division
Postal Address: _____ Postal Address: Nanaimo, British Columbia

_____ V9R 5M5

Please enter data or check as appropriate:

Location Code: 708

		9	2	3	4	5	6
Steam Generator Unit No.							
Year of First Commercial Operation		1963					
Design Capacity (lb/hr)		450,000					
Steam	Press. PSIG	675					
Conditions	Temp. °F	750					
Actual Pounds of Steam Generated in One Year ¹		939.4 x 10 ⁶ *					
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	6,776,000					
	1982(Projected)	6,776,000					
	Beyond '82 (Projected)	6,776,000					
Please Specify Type of Oil Used		No. 6					
Estimated Boiler Efficiency (%)		76%					
Boiler's Original Fuel Design and Type	Oil, Watertube	X					
	Oil, Firetube						
	Coal, Stoker						
	Coal, Pulverized						
	Other, Specify	Hog fuel					
Manufacturer's Boiler Type Designation, i.e. Type A, Type O, Type D, etc.		N/A					
Boiler Installation	Package						
	Field Erected	X					
Boiler Manufacturer		C.E.					
Unit's Capacity Factor		.24					

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: W.E. Forde Position: Environmental and Energy Co-ordinator Telephone: (604)722-3211

*Estimated by Mamenco on the basis of annual oil consumption rates.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 14S023440-1-9080
TASK A2.3: INDUSTRIAL OIL-FIRED PROCESS HEATERS AND COMBUSTORS

PHASE III - MARITIME PROVINCES

Name of Company: MacMillan Bloedel Name of Plant: Harmac Division
 Postal Address: _____ Postal Address: Nanaimo, British Columbia
 _____ V9R 5M5

Please enter data or check as appropriate:

Steam Generator Unit No.	1	2	3	4	5	6
Year of First Commercial Operation			1963			
Design Capacity (Btu/hr)			83.3 x 10 ⁶			
Actual Amount of Heat (Btu's) Generated in One Year ¹			318.5 x 10 ⁶			
Estimated Efficiency of the Unit			60%			
Heater/Combustor Manufacturer			Taylor Coen			
Unit's Capacity Factor			.44			
Application Process			Lime Kiln			
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980		2,910,000			
	1982(Projected)		Same			
	Beyond '82 (Projected)		Same			
Please Specify Type of Oil Used			No. 6			

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: 1050 BADt/day Pulp at 620 lb CaO/t = 295t CaO/day.

The above information was supplied by:

Name: W.E. Forde Position: Environmental and Energy Co-ordinator Telephone: (604)722-3211

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 14S023640-1-9080
TASK A2.3: INDUSTRIAL OIL-FIRED PROCESS HEATERS AND COMBUSTORS

PHASE III - MARITIME PROVINCES

Name of Company: Miron Inc. Name of Plant: _____
Postal Address: 2201 est, boul. Cremazie Postal Address: _____
Montreal, Quebec _____
H1Z 2C1 _____

Please enter data or check as appropriate:

	1	2	3	4	5	6
Steam Generator Unit No.						
Year of First Commercial Operation	1959	1966				
Design Capacity (Btu/hr)	242 x 10 ⁶	170 x 10 ⁶				
Actual Amount of Heat (Btu's) Generated in One Year ¹	861.4 x 10 ⁹	801 x 10 ⁹				
Estimated Efficiency of the Unit	70%*	70%*				
Heater/Combustor Manufacturer	Allis Chalmers	F.L. Smith				
Unit's Capacity Factor	.41	.54				
Application Process	burners	burners				
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	6,745,430	6,272,500			
	1982(Projected)	8,359,000	7,039,155			
	Beyond '82 (Projected)	Same	Same			
Please Specify Type of Oil Used	No. 6	No. 6				

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: Elie Chinyara Position: Process Engineer Telephone: (514)376-2020

*Estimated by Monenco on the basis of the annual oil consumption rate.

ASSESSMENT OF POTENTIAL COAL-LIQUID MIXTURE
FUEL UTILIZATION IN CANADA

DSS CONTRACT 148023440-1-9080
TASK A2.3: INDUSTRIAL OIL-FIRED PROCESS HEATERS AND COMBUSTORS

PHASE III - CANADA

Name of Company: <u>Ciment Canada Lafarge Ltee</u>	Name of Plant: _____
Postal Address: <u>625 President Kennedy</u>	Postal Address: <u>C.P. 390</u>
<u>Montreal, Que.</u>	<u>St. Constant, Quebec</u>
_____	<u>JOL 1X0</u>

Please enter data or check as appropriate:

Heater/Combustor Unit No.	1	2	3	4	5	6
Year of First Commercial Operation	1966	1975				
Design Capacity (Btu/hr)	200	200				
Actual Amount of Heat (Btu's) Generated in One Year ¹	1,226 x 10 ⁹ *	1,226 x 10 ⁹ *				
Estimated Efficiency of the Unit	70%*	70%*				
Heater/Combustor Manufacturer	F.L. Smidth Canada	F.L. Smidth Canada				
Unit's Capacity Factor	.70*	.70*				
Application Process	Cement Drying	Cement Drying				
Annual Oil-Consumption Rate (Imp.Gals./yr.)	1980	9,600,000*	9,600,000*			
	1982(Projected)	Same	Same			
	Beyond '82 (Projected)	Same	Same			
Please Specify Type of Oil Used	No.6	No. 6				

NOTE 1: A typical figure, representative of figures recorded in recent years is requested.

Comments: _____

The above information was supplied by:

Name: M. Jonckea Position: Pour Pierre Trempe, Ing. Telephone: (614)632-7750

* Estimates

APPENDIX B

ESTIMATES OF ANNUAL COAL REQUIREMENTS FOR CLM APPLICATIONS

APPENDIX B - ESTIMATES OF ANNUAL COAL REQUIREMENTS FOR CLM APPLICATIONS

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APPENDIX B

ESTIMATES OF COAL REQUIREMENTS FOR CLM APPLICATIONS

1.0 ESTIMATES OF ANNUAL COAL DEMAND

Estimates of the annual coal demand were made for the two (COM and CWM) conversion cases. These estimates were arrived at using a computer analysis program developed for this purpose.

Tables B-1 and B-2 present the summary of the computer analysis results and indicate the total annual coal demand for the converted boilers and also for the recommended replacement boilers. Table B-3 presents the annual coal demand for the converted industrial heaters and combustors. Table B-4 shows the total coal demand if every boiler, heater or combustor was to be converted to CLM. Appendix C displays the printout of the computer analysis.

1.1 METHODOLOGY

Boilers originally designed for coal firing were assumed to suffer only small losses of up to 15% in their generating capacity when converted to COM or CWM. However, boilers originally designed for oil-firing were assumed to suffer losses as large as 25% and 50% in their steaming capacity when converted to COM or CWM respectively. While no capacity reduction was assumed as a result of the combustor conversion of industrial process heaters, an efficiency loss of 15% for COM conversion and 30% for CWM conversion was used. In cases where large deratings were encountered, a replacement coal-fired boiler was inserted to make up for the lost generating capacity. The steaming capacity and the annual coal demand of the replacement boilers were established individually for each plant. A threshold loss of 20,000 lb/hr of steaming capacity was assumed to justify the installation of a replacement boiler. Losses (from all boilers at one plant) less than 20,000 lb/hr would not be compensated by replacement boilers. In actual conversion cases, the need for replacement boilers may be eliminated by increasing the current capacity factors. However, since such considerations would have required elaborated examination of each individual case, only the threshold loss was considered as the criterion for recommendation. The annual coal demand for replacement boilers is included in the estimated total annual coal demand.

The heat input rates were calculated based on the given steam conditions and certain assumed boiler inlet water conditions and boiler efficiencies. The assumed conditions are noted under the tables.

The oil burn rate values are based on the actual data collected in the survey. On those boilers where no actual fuel consumption rates were given, calculated heat input rates were used.

Using the calorific values of COM and CWM fuels along with the assumed derating percentages and the proper ratios of the coal content in the CLM fuels, the coal burn rates for the converted boilers were estimated. The coal burn rates in the replacement boilers, as mentioned earlier, were calculated separately and later added to these estimates (See Table B-4). The weighted average of the current capacity factors of each boiler category was used to project the estimated annual coal demand of the converted boilers in order to maintain their present annual load. The annual coal demands by converted heaters or combustors were calculated manually and are shown in Table B-3.

Estimates were made for the annual coal demand by those companies identified as potential prospects who did not respond to the questionnaires. These estimates were made on the basis of in-house data on their steam or heat generating capacity. To account for the small percentage of those units not covered in this survey an increased tonnage, equivalent to 5% of the total demand estimated, was added to the total coal demand figure.

TABLE B-1, ESTIMATED COAL DEMAND IN CANADA (EXCEPT MARITIME PROVINCES) DUE TO CLM CONVERSIONS OF INDUSTRIAL BOILERS

Boiler Design	Original Steaming Capacity lb/hr	No. of Units (Boilers)	Heat Input Rate MWt	COM			CWM			Average Capacity Factor	Estimated Annual Coal Demand ⁴	
				% Assumed Capacity Loss	New Capacity of Converted Boilers lb/hr	Est. Coal Burn Rate ² lb/hr	% Assumed Capacity Loss	New Capacity of Converted Boilers lb/hr	Est. Coal Burn Rate ³ lb/hr		COM APPLICATION Short Tons yr.	CWM APPLICATION Short Tons yr.
Originally Designed for Coal-Firing	4,954,000	39	1,787.4	0	4,954,000	181,246	15	4,210,900	400,590	.35	279,167	617,014
Originally Designed for Oil-Firing	Packaged Firetube	3	157.0	25	342,900	14,296	50	228,600	25,133	.25	16,090	28,476
	Packaged Watertube	42	1,354.2	25	2,839,215	104,528	50	1,892,810	181,198	.26 (Note 5)	120,058	208,119
	Modular & Field Erected	62	5,567	25	10,610,250	415,482	50	7,073,500	738,754	.35 (Note 5)	626,645	1,108,178
TOTAL (Note 6)											1,041,960	1,961,787

1. Based on the following assumptions: Boiler inlet water conditions of 250°F and 20 psi higher than the given drum pressure; consumption of No. 6 oil with HHV of 18,500 Btu/lb.

2. Based on the following assumptions: 50% COM by weight; Donkin Mine Coal with HHV of 12,000 Btu/lb for provinces east of Manitoba and Coal Valley coal with HHV of 10,900 Btu/lb for the rest of Canada; No. 6 oil with HHV of 18,500 Btu/lb.

3. Based on the assumption of 80% coal, 20% water (by weight) CWM fuel with HHV of 9,384 Btu/lb for provinces east of Manitoba and HHV of 8,524 Btu/lb for the rest of Canada.

4. The total annual coal requirement for COM or CWM operation takes into account the current capacity factor of boilers.

5. In case of dual fuel boilers, this value is based on the oil contribution alone.

6. Above total represents coal requirement calculated from questionnaires returned. For total demand, see Table B-4.

TABLE B-2, ESTIMATED COAL DEMAND
BY REPLACEMENT BOILERS¹

Boiler Category	COM		CWM	
	Lost Steaming Capacity lb/hr	Estimated Coal Demand ² s.t./yr	Lost Steaming Capacity lb/hr	Estimated Coal Demand ² s.t./yr
Industrial Boilers	4,525,700	795,210	10,578,000	1,727,402

NOTES:

¹ See Computer print-out C-2 for details.

² Based on current plant capacity factors. The figure represents the coal requirement calculated from the questionnaires returned. For total demand, see Table B-4.

TABLE B-3, ESTIMATED COAL DEMAND IN CANADA (EXCEPT MARITIME PROVINCES) DUE TO CLM CONVERSIONS OF
INDUSTRIAL PROCESS HEATERS AND COMBUSTORS

Heater/Combustor Original Design and Industrial User	No. of Units	Heat Input Rate MW _t	Oil Burn Rate lb/hr	COM ¹		COM ²		Average Capacity Factor	Estimated Annual Coal Demand ⁴	
				% Assumed Capacity Loss	Est. Coal Burn Rate ³ lb/hr	% Assumed Capacity Loss	Est. Coal Burn Rate ³ lb/hr		COM APPLICATION Short Tons yr.	COM APPLICATION Short Tons yr.
Oil-Firing	5	386.6	69,916	0	49,658	0	157,610	.57	123,976	393,490

Total (Note 5) 123,976 393,490

1. 50/50 Coal-oil mixture by weight.
2. 80/20 Coal-water mixture by weight.
3. Assuming 15% efficiency loss for COM conversion and 30% efficiency loss for COM conversion.
4. Assuming Donkin Mine Coal with HHV of 12,000 Btu/lb for provinces east of Manitoba and Coal Valley with HHV of 10,900 Btu/lb for the rest of Canada. No. 6 oil with HHV of 18,500 is considered for COM fuel.
5. Above total represents coal requirement calculated from questionnaires returned. For total demand, see Table B-4.

TABLE B-4
TOTAL ESTIMATED COAL DEMAND
DUE TO CLM CONVERSION

	<u>COM</u>	<u>CWM</u>
Demand by industrial boilers (Table B-1)	1,401,960	1,961,787
Demand by industrial replacement boilers (Table B-2)	795,210	1,727,402
Demand by industrial heaters/combustors (Table B-3)	123,976	393,490
Estimated demand of plants addressed in the survey but no response received by cut-off date	259,854	569,321
Sub-total	2,221,000	4,652,000
5% allowance for unrecorded installations	111,000	233,000
Total Demand s.t./year	2,332,000	4,885,000

APPENDIX C

COMPUTER ANALYSIS OF THE COLLECTED DATA

COMPUTER PRINTOUT C-1

This printout lists all boilers covered in the survey, according to their original design category:

- GROUP 1 Industrial boilers originally designed for coal-firing.
- GROUP 2 Industrial boilers originally designed for oil-firing;
 packaged firetube.
- GROUP 3 Industrial boilers originally designed for oil-firing;
 packaged watertube.
- GROUP 4 Industrial boilers originally designed for oil-firing;
 modular and field-erected.

The results are shown on two separate printouts since the data on Quebec and Ontario were analyzed on the basis of coal supplied from Nova Scotia and data on the remaining Provinces on the basis of coal supplied from Alberta.

LEGEND

TOTSTM: Total Steaming Capacity
THEAT: Total Heat Input Rate
TOBR: Total Oil Burn Rate
AVECF: Average Capacity Factor

DERAT1: Derating Factor Assumed for Conversion to COM
TNCAP1: Total Steaming Capacity of COM Converted Boilers
TOTCOM: Total Coal Burn Rate of Boilers Converted to COM
COMEST: Annual Coal Demand of Boilers Converted to COM

Subcode 2 or CWM refer to the above values when applied to the CWM Case.

GROUP 1 OWNERS HG HF

CAN STARCH 1195.45 218.89
 CIP INC 1196.08 218.89
 CIP INC 1241.69 218.95
 CIP INC 1241.69 218.95
 CIP INC 1241.69 218.95
 CIP INC 1241.69 218.95
 CIP INC 1241.69 218.95
 CIP INC 1241.69 218.95
 CIP INC 1231.11 218.99
 CIP INC 1199.32 218.99
 CIP INC 1231.11 218.99
 CIP INC 1197.19 218.94
 CONS BATH 1197.19 218.94
 CONS BATH 1197.19 218.94
 CONS BATH 1193.55 218.85
 CONS BATH 1193.55 218.85
 CONS BATH 1193.55 218.85
 CONS BATH 1196.08 218.89
 CONS BATH 1196.08 218.89
 COURTAUDS 1201.32 218.99
 COURTAUDS 1201.32 218.99
 COURTAUDS 1201.32 218.99
 COURTAUDS 1201.32 218.99
 DOMTAR 1199.36 218.97
 E.B.EDDY 1264.93 218.97
 E.B.EDDY 1264.93 218.97
 E.B.EDDY 1263.25 218.97
 E.B.EDDY 1289.89 219.12
 ELECTROLYS 1199.99 218.99
 ELECTROLYS 1199.99 218.99
 ELECTROLYS 1199.99 218.99
 ELECTROLYS 1199.99 218.99
 ELECTROLYS 1199.99 218.99
 GM OF CAN 1196.08 218.89
 GM OF CAN 1196.08 218.89
 J.MACLAHREN 1360.07 219.51
 ST.LAWRANC 1270.95 219.10

TOISTM(LB/HR)= 4954000.0 THEAT(MWT)=
 DERA11=1.00 TNCAP1(LB/HR)= 4954000.0
 DERA12= .85 TNCAP2(LB/HR)= 4210900.0

1787.4 TOBR(LB/HR)= 298810.7 AVECF= .35
 TOTCOM(LB/HR)= 181245.8 COMEST(ST/YR)= 279167.1
 TOTCWM(LB/HR)= 400589.0 CWEST(ST/YR)= 617014.2

GROUP 2 OWNERS HG HF

CNR 1229.50 218.94
 CNR 1229.50 218.94

TOISTM(LB/HR)= 367200.0 THEAT(MWT)=
 DERA11= .75 TNCAP1(LB/HR)= 275400.0
 DERA12= .50 TNCAP2(LB/HR)= 183600.0

132.6 TOBR(LB/HR)= 24185.4 AVECF= .22
 TOTCOM(LB/HR)= 10993.3 COMEST(ST/YR)= 10593.1
 TOTCWM(LB/HR)= 19056.7 CWEST(ST/YR)= 18363.0

GROUP 3 OWNERS HG HF

AGROPUR	1195.89	218.88
AGROPUR	1195.45	218.89
AGROPUR	1197.61	218.93
AGROPUR	1197.61	218.93
AGROPUR	1197.61	218.93
BASF CAN	1331.02	219.71
BASF CAN	1331.02	219.71
CAN STARCH	1195.45	218.89
CIL	1204.24	219.20
CIL INC	1223.91	218.95
CIL INC	1223.91	218.95
CIL INC	1223.91	218.95
CIL INC	1223.91	218.95
CIP INC	1223.91	218.95
CIP INC	1196.08	218.89
CIP INC	1201.74	219.04
CIP INC	1201.74	219.04
CONS PATH	1193.55	218.85
CONS PATH	1196.08	218.89
COURTALOS	1201.32	218.99
COURTALOS	1201.32	218.99
DOFASCU	1314.44	219.20
DONOHUE	1199.99	218.99
DONOHUE	1199.99	218.99
G4 OF CAN	1196.08	218.89
PAR KINGSY	1201.67	219.10
QUEENS UNI	1193.42	218.84
QUEENS UNI	1203.21	219.15
QUEENS UNI	1203.21	219.15
QUEENS UNI	1203.21	219.15
RIO ALGOM	1201.78	219.06
RIO ALGOM	1201.78	219.06
RIO ALGOM	1193.42	218.84
RIO ALGOM	1193.42	218.84
SCHENLEY	1194.31	218.86
SCHENLEY	1194.31	218.86
SOUCY INC	1197.14	218.91
SOUCY INC	1197.14	218.91
SOUCY INC	1197.14	218.91
UNION CARB	1271.41	219.51
WESTINGHSE	1193.42	218.84
WESTINGHSE	1202.37	219.10
WESTINGHSE	1202.37	219.10

TOTSTM(LB/HR)= 3785620.0 THEAT(MMT)=
 DERAT1= .75 TNCAP1(LB/HR)= 2839215.0
 DERAT2= .50 TNCAP2(LB/HR)= 1892810.0

1354.2 TOBR(LB/HR)= 229773.0 AVECF= .26
 TOTCOM(LB/HR)= 104527.9 COMEST(ST/YR)= 120056.0
 TOTCWM(LB/HR)= 181197.8 CWMEST(ST/YR)= 208119.0

GROUP 4 O=MENS HG HF

ABITIBI PC	1265.01	219.04
ABITIBI PC	1265.01	219.04
ABITIBI PC	1265.01	219.04
AMERICAN	1358.93	219.86
CATELLI	1199.99	218.99
CIP INC	1262.21	219.10
CIP INC	1262.21	219.10

CIP INC	1205.79	219.61
CIP INC	1265.01	219.04
CJS BATH	1196.50	218.91
CJS BATH	1196.50	218.91
CJS BATH	1196.08	218.89
DOFASCU	1314.44	219.20
DOFASCU	1314.44	219.20
DOYOHUE	1201.32	218.99
DOYOHUE	1199.99	218.99
DOYOHUE	1199.99	218.99
E.B.EDDY	1287.14	219.18
ESSO PETRO	1373.58	220.07
ESSO PETRO	1373.58	220.07
ESSO PETRO	1373.58	220.07
ESSO PETRO	1373.58	220.07
GM OF CAN	1196.50	218.91
GULF CAN	1378.76	219.87
GULF CAN	1379.52	219.84
GULF CAN	1379.52	219.84
GULF CAN	1379.52	219.84
GULF CAN	1379.52	219.84
GULF CAN	1379.52	219.84
GULF CAN	1379.52	219.84
KRUGER	1244.38	218.91
KRUGER	1244.38	218.91
LAVAL UNIV	1193.42	218.84
LAVAL UNIV	1193.42	218.84
LAVAL UNIV	1193.42	218.84
LAVAL UNIV	1193.42	218.84
ROLLAND	1194.31	218.86
ROLLAND	1194.31	218.86
SHELL CAN	1377.48	219.92
SHELL CAN	1377.48	219.92
ST.LAWRENC	1191.99	218.83
ST.LAWRENC	1191.99	218.83
ST.LAWRENC	1191.99	218.83
TEXACO	1190.01	218.89
UNION CARB	1271.41	219.51

TOTSTM(LB/HR)= 827200.0 THEAT(MWT)=
 DERAT1= .75 INCAP1(LB/HR)= 6204000.0
 DERAT2= .50 INCAP2(LB/HR)= 4136000.0
 3088.1 FUBK(LB/HR)= 529606.5 AVECF= .40
 TOTCOM(LB/HR)= 240927.5 COMEST(ST/YR)= 420282.1
 TOTCWM(LB/HR)= 417644.9 CWMEST(ST/YR)= 728553.8

PRINTOUT C-1
DATA FROM BRITISH COLUMBIA
AND NORTHWEST TERRITORIES

GROUP 2 OWNERS HG HF
 INUVIK 321.86 219.03

LOTISM(LB/HR)= 90000.0 THEAT(MWT)=
 DERAT1= .75 TNCAP1(LB/HR)= 67500.0
 DERAT2= .50 TNCAP2(LB/HR)= 45000.0

3.2 TUBK(LB/HR)= 3303.0 AVECF= .38
 TOTCOM(LB/HR)= 6076.2 COMEST(ST/YR)= 5497.5
 TOTCMK(LB/HR)= 6076.2 CMEST(ST/YR)= 10113.2

GROUP 4 OWNERS HG HF

MC BLOEDEL 1407.96 219.81
 MC BLOEDEL 1479.49 220.48
 CANFOR 1276.53 219.40
 CANFOR 1276.53 219.40
 ESSO MINER 1380.03 219.81
 ESSO MINER 1380.03 219.81
 WESTFOR 1380.03 219.81
 WESTFOR 1380.03 219.81
 B.C.F.P. 1378.76 219.87
 B.C.F.P. 1378.76 219.87
 B.C.F.P. 1378.76 219.87
 B.C.F.P. 1378.76 219.87
 TANSIS 1378.76 219.87
 CROWN ZELL 1331.66 219.97
 CROWN ZELL 1331.32 219.98
 CROWN ZELL 1343.76 220.07
 MC BLOEDEL 1376.19 219.97
 MC BLOEDEL 1380.03 219.81
 MC BLOEDEL 1380.03 219.81

LOTISM(LB/HR)= 567500.0 THEAT(MWT)=
 DERAT1= .75 TNCAP1(LB/HR)= 440250.0
 DERAT2= .50 TNCAP2(LB/HR)= 293750.0

2479.2 TUBK(LB/HR)= 369865.9 AVECF= .27
 TOTCOM(LB/HR)= 174554.1 COMEST(ST/YR)= 206362.6
 TOTCMK(LB/HR)= 321109.4 CMEST(ST/YR)= 379624.2

PRINTOUT C-2
DATA FROM ONTARIO
AND QUEBEC

COMPUTER PRINTOUT C-2

This printout lists the annual coal demands of those companies requiring replacement boilers.

The first printout refers to data from Quebec and Ontario and the second to the data on the remaining Provinces.

LEGEND

TLSTM1: Company's Total Lost Steaming Capacity Due to COM Conversion
RBEST1: Annual Coal Demand for Replacement Boilers Needed in COM
Converted Plants
AVECF1: Average Capacity Factor (current figure)

Subcode 2 refers to the above values when applied to the CWM case.

OWNER: ABILIBI PC
LOCATION: 615

ILSTM1= 51250.0 RBEST1= 12206.8 AVCF1= .47
ILSTM2= 102500.0 RBEST2= 24413.8 AVCF2= .47

OWNER: AGROPUR
LOCATION: 602

ILSTM1= 57000.0 RBEST1= 2679.1 AVCF1= .10
ILSTM2= 114000.0 RBEST2= 5350.2 AVCF2= .10

OWNER: AGROPUR
LOCATION: 603

ILSTM1= 25000.0 RBEST1= 3048.6 AVCF1= .26
ILSTM2= 50000.0 RBEST2= 6097.0 AVCF2= .26

OWNER: AGROPUR
LOCATION: 604

NO REP. BOILER NEEDED FOR COM CONVERSION
ILSTM1= 31500.0 RBEST1= 2069.2 AVCF1= .14
ILSTM2= 31500.0 RBEST2= 2069.2 AVCF2= .14

OWNER: AMERICAN
LOCATION: 513

ILSTM1= 31250.0 RBEST1= 6325.4 AVCF1= .37
ILSTM2= 62500.0 RBEST2= 12650.6 AVCF2= .37

OWNER: BASF CAN
LOCATION: 609

ILSTM1= 78750.0 RBEST1= 840.6 AVCF1= .02
ILSTM2= 157500.0 RBEST2= 1681.2 AVCF2= .02

OWNER: CAN STARCH
LOCATION: 516

ILSTM1= 25000.0 RBEST1= 2110.5 AVCF1= .18
ILSTM2= 65000.0 RBEST2= 7879.3 AVCF2= .26

OWNER: CATELLI
LOCATION: 617

NO REP. BOILER NEEDED FOR COM CONVERSION
ILSTM1= 30000.0 RBEST1= 1130.7 AVCF1= .08
ILSTM2= 30000.0 RBEST2= 1130.7 AVCF2= .08

OWNER: CIL
LOCATION: 504

NO REP. BOILER NEEDED FOR COM CONVERSION
ILSTM1= 25000.0 RBEST1= 1301.0 AVCF1= .11
ILSTM2= 25000.0 RBEST2= 1301.0 AVCF2= .11

OWNER: CIL INC
LOCATION: 616

ILSTM1= 76005.0 RBEST1= 14372.9 AVCF1= .39
ILSTM2= 152010.0 RBEST2= 28745.6 AVCF2= .39

OWNER: CIP INC
LOCATION: 502

ILSTM1= 25000.0 RBEST1= 9268.8 AVCF1= .79
ILSTM2= 65000.0 RBEST2= 24098.9 AVCF2= .79

OWNER: CIP INC
LOCATION: 601

ILSTM1= 111250.0 RBEST1= 21937.7 AVCF1= .40
ILSTM2= 323300.0 RBEST2= 63291.0 AVCF2= .40

OWNER: CIP INC
LOCATION: 605

TLSTM1= 315000.0
TLSTM2= 630000.0
RBEST1= 56387.9
RBEST2= 116775.9
AVCF1= .37
AVCF2= .37

OWNER: CIP INC
LOCATION: 612

TLSTM1= 40000.0
TLSTM2= 80000.0
RBEST1= 9061.3
RBEST2= 18123.1
AVCF1= .48
AVCF2= .48

OWNER: CIP INC
LOCATION: 619

NO REP. BOILER NEEDED FOR COM CONVERSION
TLSTM2= 72000.0
RBEST2= 25462.8
AVCF2= .72

OWNER: CNR
LOCATION: 611

TLSTM1= 91800.0
TLSTM2= 183600.0
RBEST1= 9801.7
RBEST2= 19603.7
AVCF1= .22
AVCF2= .22

OWNER: CONS BATH
LOCATION: 607

TLSTM1= 41500.0
TLSTM2= 150500.0
RBEST1= 1359.9
RBEST2= 9460.6
AVCF1= .07
AVCF2= .13

OWNER: CONS BATH
LOCATION: 610

NO REP. BOILER NEEDED FOR COM CONVERSION
TLSTM2= 58500.0
RBEST2= 10994.0
AVCF2= .40

OWNER: CONS BATH
LOCATION: 622

TLSTM1= 129750.0
TLSTM2= 259500.0
RBEST1= 18543.0
RBEST2= 37085.7
AVCF1= .30
AVCF2= .30

OWNER: CONS BATH
LOCATION: 625

TLSTM1= 78000.0
TLSTM2= 210900.0
RBEST1= 12333.4
RBEST2= 30077.5
AVCF1= .34
AVCF2= .30

OWNER: COURTAIDS
LOCATION: 505

TLSTM1= 53750.0
TLSTM2= 160000.0
RBEST1= 8197.1
RBEST2= 22940.1
AVCF1= .32
AVCF2= .30

OWNER: DOFASCO
LOCATION: 517

TLSTM1= 72500.0
TLSTM2= 145000.0
RBEST1= 7758.6
RBEST2= 15517.1
AVCF1= .20
AVCF2= .20

OWNER: DOMTAK
LOCATION: 515

NO REP. BOILER NEEDED FOR COM CONVERSION
TLSTM2= 54000.0
RBEST2= 6356.4
AVCF2= .25

OWNER: DONOHUE
LOCATION: 608

TLSTM1= 137500.0
TLSTM2= 275000.0
RBEST1= 24451.0
RBEST2= 48902.1
AVCF1= .38
AVCF2= .38

OWNER: E.B. EDU
LOCATION: 503

TLSTM1= 68750.0 RBEST1= 4231.4 AVCF1= .12
TLSTM2= 194500.0 RBEST2= 15254.3 AVCF2= .15

OWNER: ELECTROLYS
LOCATION: 621

NO REP. BOILER NEEDED FOR COM CONVERSION
TLSTM2= 117900.0 RBEST2= 14442.5 AVCF2= .26

OWNER: ESSO PETRO
LOCATION: 516

TLSTM1= 218750.0 RBEST1= 92100.9 AVCF1= .76
TLSTM2= 437500.0 RBEST2= 184201.1 AVCF2= .76

OWNER: GM OF CAN
LOCATION: 508

TLSTM1= 21250.0 RBEST1= 398.9 AVCF1= .04
TLSTM2= 72500.0 RBEST2= 3332.1 AVCF2= .10

OWNER: GM OF CAN
LOCATION: 520

TLSTM1= 50000.0 RBEST1= 3756.0 AVCF1= .16
TLSTM2= 100000.0 RBEST2= 7512.0 AVCF2= .16

OWNER: GULF CAN
LOCATION: 521

TLSTM1= 291250.0 RBEST1= 64767.5 AVCF1= .40
TLSTM2= 582500.0 RBEST2= 129535.1 AVCF2= .40

OWNER: GULF CAN
LOCATION: 618

TLSTM1= 200000.0 RBEST1= 21303.5 AVCF1= .19
TLSTM2= 400000.0 RBEST2= 42607.0 AVCF2= .19

OWNER: J. MACLAREN
LOCATION: 623

NO REP. BOILER NEEDED FOR COM CONVERSION
TLSTM2= 33000.0 RBEST2= 10845.8 AVCF2= .60

OWNER: KRUGER
LOCATION: 613

TLSTM1= 48750.0 RBEST1= 14682.7 AVCF1= .61
TLSTM2= 97500.0 RBEST2= 29365.1 AVCF2= .61

OWNER: LAVAL UNIV
LOCATION: 624

TLSTM1= 75000.0 RBEST1= 6318.7 AVCF1= .18
TLSTM2= 150000.0 RBEST2= 12637.4 AVCF2= .18

OWNER: PAR KINGSY
LOCATION: 627

NO REP. BOILER NEEDED FOR COM CONVERSION
TLSTM2= 27000.0 RBEST2= 6880.1 AVCF2= .54

OWNER: QUEENS UNI
LOCATION: 519

TLSTM1= 125000.0 RBEST1= 9856.2 AVCF1= .17
TLSTM2= 250000.0 RBEST2= 19712.3 AVCF2= .17

OWNER: RIO ALGOA
LOCATION: 501

TLSTM1=	30000.0	RBEST1=	5946.7	AVCF1=	.42
TLSTM2=	60000.0	RBEST2=	11893.8	AVCF2=	.42

OWNER: RIO ALGOA
LOCATION: 511

TLSTM1=	25000.0	RBEST1=	8191.1	AVCF1=	.70
TLSTM2=	50000.0	RBEST2=	16351.6	AVCF2=	.70

OWNER: ROLLAND
LOCATION: 614

TLSTM1=	49000.0	RBEST1=	10996.6	AVCF1=	.48
TLSTM2=	98000.0	RBEST2=	21997.1	AVCF2=	.48

OWNER: SCHENLEY
LOCATION: 626

TLSTM1=	47500.0	RBEST1=	2319.0	AVCF1=	.18
TLSTM2=	55000.0	RBEST2=	4637.8	AVCF2=	.18

OWNER: SHELL CAN
LOCATION: 512

TLSTM1=	150000.0	RBEST1=	63376.4	AVCF1=	.76
TLSTM2=	300000.0	RBEST2=	126752.7	AVCF2=	.76

OWNER: SOUCY INC
LOCATION: 620

TLSTM1=	63900.0	RBEST1=	7104.9	AVCF1=	.24
TLSTM2=	127800.0	RBEST2=	14209.7	AVCF2=	.24

OWNER: ST. LAWRANC
LOCATION: 509

NO REP. BOILER NEEDED FOR COM CONVERSION					
NO REP. BOILER NEEDED FOR CWM CONVERSION					

OWNER: ST. LAWRENC
LOCATION: 606

TLSTM1=	45000.0	RBEST1=	1892.9	AVCF1=	.09
TLSTM2=	90000.0	RBEST2=	3785.7	AVCF2=	.09

OWNER: TEXACO
LOCATION: 506

TLSTM1=	25000.0	RBEST1=	5713.4	AVCF1=	.49
TLSTM2=	50000.0	RBEST2=	11426.6	AVCF2=	.49

OWNER: UNION CARB
LOCATION: 628

TLSTM1=	50000.0	RBEST1=	6062.3	AVCF1=	.24
TLSTM2=	100000.0	RBEST2=	12124.5	AVCF2=	.24

OWNER: WESTINGHSE
LOCATION: 510

NO REP. BOILER NEEDED FOR COM CONVERSION					
TLSTM2=	30000.0	RBEST2=	842.5	AVCF2=	.06

OWNER: WESTINGHSE
LOCATION: 514

TLSTM1=	30000.0	RBEST1=	1983.3	AVCF1=	.14
TLSTM2=	60000.0	RBEST2=	3966.8	AVCF2=	.14

TOTAL CUM COAL DEM. (IND. & UTIL.)) S.T./YR = 553688.7
TOTAL CUM COAL DEM. (IND. & UTIL.)) S.T./YR = 1244359.2

PRINTOUT C-2
DATA FROM BRITISH COLUMBIA
AND NORTHWEST TERRITORIES

OWNER: B.C.F.P.
LOCATION: 702

TLSTM1= 312500.0
TLSTM2= 625000.0
RBEST1= 39674.8
RBEST2= 79349.8
AVCF1= .21
AVCF2= .21

OWNER: CANFOR
LOCATION: 706

TLSTM1= 110000.0
TLSTM2= 220000.0
RBEST1= 12911.4
RBEST2= 25822.8
AVCF1= .21
AVCF2= .21

OWNER: CRUM ZELL
LOCATION: 707

TLSTM1= 203750.0
TLSTM2= 407500.0
RBEST1= 88515.6
RBEST2= 133031.2
AVCF1= .55
AVCF2= .55

OWNER: ESSO MINER
LOCATION: 704

TLSTM1= 130000.0
TLSTM2= 260000.0
RBEST1= 12759.8
RBEST2= 25519.1
AVCF1= .16
AVCF2= .16

OWNER: INUVIK
LOCATION: 801

TLSTM1= 22500.0
TLSTM2= 45000.0
RBEST1= 464.9
RBEST2= 929.6
AVCF1= .38
AVCF2= .36

OWNER: MC BLOEDEL
LOCATION: 705

CONFIDENTIAL INFORMATION

OWNER: MC BLOEDEL
LOCATION: 708

TLSTM1= 112500.0
TLSTM2= 225000.0
RBEST1= 16505.8
RBEST2= 33011.7
AVCF1= .24
AVCF2= .24

OWNER: MC BLOEDEL
LOCATION: 709

TLSTM1= 181250.0
TLSTM2= 362500.0
RBEST1= 15144.3
RBEST2= 30288.6
AVCF1= .14
AVCF2= .14

OWNER: IAMSIS
LOCATION: 701

TLSTM1= 131250.0
TLSTM2= 262500.0
RBEST1= 11259.1
RBEST2= 22518.2
AVCF1= .14
AVCF2= .14

OWNER: RESIFUR
LOCATION: 703

TLSTM1= 97500.0
TLSTM2= 195000.0
RBEST1= 32788.3
RBEST2= 65576.5
AVCF1= .55
AVCF2= .55

TOTAL COM COAL DEW. (IND. & UTIL.), S.T./YR = 241521.6
TOTAL COM COAL DEW. (IND. & UTIL.), S.T./YR = 483043.2

APPENDIX D

WASTE DISCHARGE OBJECTIVES - ONTARIO

APPENDIX D - WASTE DISCHARGE OBJECTIVES - ONTARIO

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Desirable Effluent Discharge Characteristics	D-1

Objectives For the Control of Industrial Wastes Discharges in Ontario

The Ministry of the Environment requires all industries discharging wastes to public waters to undertake effluent improvement programs to meet the following objectives:

Protection of Receiving Water

In keeping with the overall policy of protecting water quality while recognizing an essential use for treated wastewater disposal, the Ministry may require industries contributing wastes not specified in the following, to limit, destroy, remove or modify any waste constituents that are not readily removed by conventional treatment and are only reduced by dilution and other natural stream purification processes.

In order to maintain acceptable water quality conditions in the receiving water, it will be necessary for industry to provide more intensive waste treatment as the density of industrial and other development increases.

Desirable Effluent Discharge Characteristics

- .1 5-day Biochemical; Oxygen Demand (BOD) - Unless otherwise specified by the Ministry, the concentration of BOD in waste-waters at the point of discharge to the receiving waters shall not exceed 15 milligrams per litre (mg/L) at any time. In determining the acceptability of BOD concentrations in wastewater discharges other than 15 mg/L, the Ministry will apply the following criteria:
 - The BOD in the receiving stream after initial dilution shall not exceed 4 mg/L at any time consistent with specified minimum levels of flow.
 - The concentration of dissolved oxygen (DO) in the receiving stream shall not fall below 6 mg/L for receiving waters inhabited by cold water fishes or below 5 mg/L for receiving water inhabited by warm water fishes.
- .2 Suspended Solids - The concentration of suspended solids in wastewater at the point of discharge to a receiving water shall not exceed the concentration of suspended solids in the industrial water supply by more than 15 parts per million by weight, or as otherwise specified by the Ministry.

- .3 Oils and Greases - The concentration of oils and greases of vegetable, animal or mineral origin in wastewater shall not exceed 15 parts per million by weight at the point of discharge to the receiving water.

For certain receiving waters, the requirement may be reduced below the 15 ppm limit to prevent objectionable aesthetic conditions arising.

- .4 Metals - Unless specified otherwise by the Ministry, the concentrations of component heavy metals in wastewater discharges shall not exceed the limits specified below:

- cadmium	0.001 mg/L (essentially zero)
- chromium	1.0 mg/L
- copper	1.0 mg/L
- lead	1.0 mg/L
- mercury	0.001 mg/L (essentially zero)
- nickel	1.0 mg/L
- tin	1.0 mg/L
- zinc	1.0 mg/L

NOTE: The total quantity of metals discharged will also be considered and dilution with clean water streams to achieve the above concentrations is not acceptable.

- .5 Phenols - Unless otherwise specified by the Ministry, the concentration of phenol in wastewaters at the point of discharge shall not exceed 20 parts per billion (ppb). In determining the acceptability of phenol concentrations in wastewater discharges other than 20 ppb, the Ministry will apply the following criteria:

- phenol or phenolic equivalents should not exceed an average of 2 ppb or a maximum of 5 ppb in the receiving waters following initial dilution in a defined mixing zone.

- .6 Toxic Substances - Materials or waste components that are toxic to aquatic life or render the water unsuitable for potable or recreational uses shall be eliminated or destroyed.

- .7 Ammonia - Unless otherwise specified by the Ministry, the concentration of ammonia (NH_3 as N) in wastewaters at the point of discharge to the receiving waters shall not exceed 10 milligrams per litre (mg/L) at any time.

In view of the known acute toxicity of ammonia to aquatic life, a more stringent effluent quality requirement may be applied consistent with the availability of practicable technology.

- .8 pH - the pH or relative acidity or basicity of wastewaters shall be controlled and maintained within the range of 5.5 to 9.5.
- .9 Sulphate, Chlorides and Dissolved Solids - The policy of the Ministry is to minimize the build-up of sulphates, chlorides and dissolved solids in the receiving waters. Therefore, the quantities of these materials in wastewater discharges should be kept as low as possible consistent with the application of best available, practicable technology.
- .10 Taste and Odour - Waste materials or components of wastewaters that impart tastes and odours to the receiving waters or to fish and thereby render the waters or the fish unsuitable for use shall be eliminated or destroyed prior to the discharge of the wastewaters.
- .11 Temperature - Unless otherwise specified by the Ministry, the temperature of wastewaters (including cooling waters) at the point of discharge, shall not exceed the temperature of the receiving waters by more than 11°C (20°F).

More stringent requirements may be imposed where it is considered that a change in the general level of temperature in the receiving stream, resulting from a heated discharge, may exceed the temperature tolerance range of an established fish species.

- .12 Aesthetic Qualities - Treatment or control shall be effected to ensure that waste discharges do not impair the aesthetic qualities of the receiving water by imparting colour, by giving rise to accumulations of solids, oils or greases, by inducing foaming, or by other adverse effects.

POOR

QUALITY

ORIGINAL